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THE SOCIAL CONSTRUCTION OF SYSTEMS APPLICATIONS PRODUCTS (SAP) R/3 BY EMPLOYEES OF A SOUTH AFRICAN CHEMICAL INDUSTRIES COMPANY

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ABSTRACT

Many companies that have implemented an Enterprise Resource Planning (ERP) system do not reap the intended benefits of the potential inherent in these systems despite their exorbitant implementation cost. The reasons for this are numerous. This study is aimed at understanding the social impact a Systems Applications Products (SAP) R/3 implementation had on the end users of a South African Company in the Chemical Industry. A qualitative process evaluation study was undertaken to obtain a clearer understanding of the underlying organisational cultural factors that emerged from such an implementation. The objective was to provide a framework for companies considering such an implementation to ensure better system productivity and to assist companies already using an ERP solution with continuous improvement.

OPSOMMING

Vele maatskappy ontgun nie al die moontlike voordele van die implimentering van 'n "Enterprise Resource Planning" (ERP) stelsel nie ten spyte van die hoë implimenteringskoste verbonde aan sulke stelsels. Die redes hiervoor is legio. Die studie het dit ten doel gehad om die impak te verstaan wat so 'n stelselimplimentering het op die eindverbrukers van 'n Suid Afrikaanse maatskappy in die Chemiese Bedryf. 'n Proses-evalueringstudie was onderneem om meer duidelikheid te kry oor die onderliggende kulturele faktore wat ontstaan het tydens die implimentering van 'n "Systems Applications Products" (SAP R/3). Die doel van die studie was om 'n raamwerk te skep waarbinne maatskappye wat soortgelyke stelselimplimenterings oorweeg hulself kan voorberei vir hoër stelsel produktiwiteit. Laastens was die doel om insig aan maatskappye wat alreeds 'n ERP stelsel geïmplimenteer het te bied oor die impak

Background to Information Technologies and Business

Information Technology (IT) has been a powerful force in the far-reaching changes that have taken place in the way people accomplish their work in the 21st century. Not surprisingly, the role that IT plays in business has also given rise to various crucial questions. Undoubtedly, a key issue is whether resources and money invested by business in such innovation justify the expected increased productivity and return on investment. Donovan-Wright, in an article entitled "*How to do ERP Right*" (2003), quotes Fritz who, working as project manager in assisting organizations undergoing Enterprise Resource Planning (ERP) implementations, warns that organizations implementing ERP from a pure technology perspective are bound to experience an enormous people issue. Working for a company that lost $50 million in revenues after a project implementation, Fritz substantiates this claim by pointing out: "[t]his is evidenced by predictable performance dips of 25 to 50 percent for the first six to eight months after system launch" (Donovan-Wright, 24/3/2003).

The issue of returns on vast IT expenditure also received attention by Taylor (1995) who states that modern organizations are critically dependent on IT for their daily operations and that it is thus crucial when designing information system solutions that business engineering efforts are focused on improving business process as well as productivity. He comments that while American companies spent in excess of a trillion dollars on information technology during the 1980's their overall office productivity increased by only one percentage point. He concludes: "Given the obvious advantages of automating routine business processes, there is clearly something wrong with this picture" (Taylor, 1995, p. 188).

Siegele (2003), after having undertaken a survey on the IT industry, describes how the divide between business and Information Management (IM) departments causes the miscalculation of IT project implementations. He explains: "This set-up creates permanent tension between IT departments and the business units. It is also the main reason why so many IT projects are over budget and late. And when they are up and running at last, they often turn out to be obsolete already; or they do not get used because they take no account of **how employees actually do their work**" (Siegele, 2003, p. 22) (emphasis added).

After having worked in the field of ERP system implementations and more specifically Systems Applications Products (SAP) R/3 for the past four years, the first author, Beyleveld[1], feels that the inherent problem implies the lack of competency development in business' understanding of people using these systems and the resultant lack of business ownership. The focus remains largely on a transactional level of the implemented technology[2]. Consequently, the emerging social and cultural environment, which would enable the business and its system implementers to be more proactive, is not understood properly. The reasons for this are numerous and include amongst others: (i) we do not know what these competencies are, (ii) project implementation limits the time available to position people and teach them the new skills required, and, (iii), the social environment and culture following ERP implementation are largely unknown contributing to misjudging, if not discounting the emerging culture, when adopting new ways of working.

Impact of Information Technologies on Business

Some of our experiences and views, as well as related viewpoints of other scholars, bear testament to the reasons given by Axelrod (2000) as to why the traditional change management paradigm does not meet the challenges of the contemporary corporate world. He (Axelrod 2000) argues that the traditional paradigm produces unintended negative consequences, as its models do not cater for current challenges. Axelrod (2000, p. 18) focuses on the following six factors which he believes accounts for the ineffectiveness of

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1 In order to adhere to the journal guidelines the decision was made to write this study in the third person, even though it is acceptable practice in qualitative research to write research reports in the first person. Arnold Beyleveld conducted the research project and is the first author of this article, while Willem Schurink is the second author who as study leader assisted with the planning of the research and writing of the article.

2 This differs somewhat from Fritz's technology and relates to business processes and people requirements.

change management: (i) allowing a small number of people to decide for many; (ii) isolating leaders and organization members from one another; (iii) separating the design process from that of implementation; (iv) adopting the parallel organization but not its underlying values; (v) assigning a primary role to process improvements and a secondary one to cultural shifts, and (vi) being unequal in the process itself.

The position taken in this article is that the focus on the transactional level of the implemented technology has resulted in South African businesses not being able to exploit or optimally develop the competencies needed to tap the value of these technologies. We believe it is crucial for business to view the ERP system as an Information Management Tool to be used in enabling them to encourage their business processes and not to regard it as the responsibility of some IM Department.

Organisational dynamics are of crucial importance and it is appropriate at this juncture to explore some specifics of other developments highlighted by Axelrod (2000) and other specialists. Axelrod points to the following: "As the parallel organization was adopted by process-driven change, the concept of shifting the organization's culture began to fade into the background and eventually disappeared entirely. What became primary was implementing the change, often through technology. Even though the development of new systems and structures required people to change the way they worked and the partners they worked with, these cultural aspects were deemed secondary. There are many examples of reorganizations and reengineering processes designed to create new internal working relationships or to improve customer service that completely ignored the cultural aspects of change. People soon found themselves in new organisational configurations designed to produce cooperation, teamwork, and improved customer service while old hierarchical silo culture remained unchanged. **This failure to deal with cultural aspects of change undermined the benefits of the system**" (Axelrod, 2000, p. 23) (Emphasis added).

Davenport (1999) appropriately points out that organizations build and strengthen their capabilities, by improving them to affect a winning strategy. Developing organization capabilities, in turn, calls for the manipulation of a set of implementation levers. He (Davenport, 1999, p. 49) distinguishes the following "four levers": (i) **human capital**[3]; (ii) **organization structure**[4]; (iii) **work processes**[5], and, (iv) **technology**[6]. Davenport (1999) believes that to acquire a competitive advantage, organizations need to ensure that the aforementioned levers are taken into consideration.

Looking at ERP project implementation, it is clear that the focus is typically on structure, process and technology with little attention given to developing people competencies to drive these components. In real terms, 'people development' receives attention only when the operation of the new system is addressed after the go-live phase of a SAP R/3 project implementation. He (Davenport 1999) rightly argues that companies place a high premium on the ability of individuals to act strategically. Since the advent of technological innovation, the shortening of the time-to-market period, and the growing demand for continued innovation and productivity have changed at a rapid pace resulting in strategic performance becoming crucial. According to Davenport (1999), in order for an individual to be the 'right worker', i.e. someone who is capable of observing the environment, assessing the company's position, and responding creatively to a demanding environment of today, s/he needs to re-skill him/herself continuously.

Before concluding this introduction, it is necessary to emphasize the purpose of ERP implementation and some of its shortcomings[7]. First and foremost, as has been implied already, an ERP implementation is intended to assist organizations in planning their strategies. While we supply people with the necessary technology and redesign processes and structures with world best practices, we barely, if at all, provide the necessary assistance to enable people to exploit the new system properly. In addition, while we certainly empower organizations, there is no doubt that we also, unintentionally, tend to weaken the potentially critical role the work force could play in influencing organisational strategies striving towards achieving competitive advantage. This unfortunate state of affairs is mainly due to an inadequate understanding of the social and cultural environment emerging from SAP R/3 implementation.

Problem Statement

From the preceding it should be clear that ERP implementations are very costly, complex and consequently have a significant impact on organizations as a whole. The purpose of such implementations is at the very least to ensure organisational performance, improved customer service, cost savings, and good return on investments. Reaping the benefits of ERP implementations after the execution of the project represents one of the challenges contemporary companies are faced with. Productivity and system effectiveness are obviously a result of the interaction between the people and the system, and do not come about merely because a new system has been implemented. Therefore, it follows that productivity and effectiveness will only occur if the users of the technology are sufficiently developed to improve their skills, knowledge, potential and mind-set (Bacal, 3/2/2003).[8] Furthermore, ERP implementations imply major cultural changes since project teams focus purely on technology and silo based business process implementations. Integrated business processes are not in operation until the system is activated. Such integration is only tested during the final preparation phase of the implementation project and then only on the technical configuration aspects of the project. In other words, true integration of the business processes are not mapped out in real life situations, thus true business re-engineering does not take place. This results in people trying to operate the system in an 'old' culture of business operation and not exploiting the benefits of an integrated business model. According to Davidson (in Donovan-Wright 24/3/2003), "Companies did not realize they were going through a cultural change as well as a process change until they were well into the implementation. The technology-based project teams didn't realize they needed buy-in, and often, HR wasn't brought in until it was too late".

Technology, first and foremost, entails the application of knowledge to execute business processes more effectively through tasks or activities. Nel et al. (2002) state that organisational technology prescribes the techniques necessary to transform inputs into outputs. According to them, it can be argued that all managers and levels of staff in contemporary organizations make use of technology in transforming their organizations. Consequently, the effect of technology on organisational structure and behaviour is more pronounced than ever before. Mullins (1999) notes that in today's work environment technology has an influence on both the behaviour of people and the climate of the organization. Information technology, he believes, affects the nature of individual jobs and the formation and structure of working groups. Finally, advances in technical knowledge tend to develop at a faster rate than, and in isolation from, related human and social consequences. In the IT industry this is commonly refer to as the Law of Moore[9]. The world is rapidly

3 The intangible resources of abilities, effort and time workers bring to invest in their work. **4** The pattern of relationships between units and individuals within the organisation. **5** The series of actions and operations that yield products and services. **6** The employment of mechanical means, especially science and computer related, to perform tasks and manage information. **7** The main purpose of an ERP system is to streamline the data collection and the processing, based on the information needs of the industry segment. Better information leads to better business decisions, which in turn contribute to improved business performance (Higuet & Kelly, 1998). **8** Ideally, these competencies should not only be transactional skills, knowledge and capabilities, but should include supplementary skills and knowledge (Bacal, 3/2/2003). **9** Moore predicted that the number of transistors which could be put on a single computer chip would double every 18 months. Moore's prediction has broadly been proved accurate between 1971 and 2001 (Siegele, 2003, p. 3). This development caused the rapid growth in the IT industry's capabilities.

becoming increasingly complex through the accelerated development and application of IT resulting in organizations having to respond much faster to challenges. This demand requires quantum leap change, rather than adaptive change, from organizations. In order to achieve this, a new breed of leader is required (Nel et al. 2002).

From the preceding, the applicability, if not necessity, of researching the topic is threefold; (i) organisational development to shorten the period of system stabilization after project implementation, (ii) competency development to ensure a higher level of productivity and effectiveness and (iii) leadership and organisational culture to ensure return on investment in a shorter period of time. A better understanding of the social environment and culture of the end users that have been developed owing to ERP implementation can contribute to all these areas.

Aim of study

The main aim of the study was to become familiar with the current everyday experiences and viewpoints of a group of end users in a South African company in the Chemical Industry which have been exposed to an ERP implementation for the past two and a half to three years. Their subjective, insider experiences of the system and their views, particularly as to whether anything could have been done differently to make the application of the system easier, were elicited and described. This implies that a process evaluation was undertaken in which the staff's everyday lived experiences, i.e. their understanding of behaviour, competencies, attitudes and values, were elicited and described.

METHOD

Research Setting

Because of the typical in-depth and comprehensive descriptive nature of qualitative research, the study needed to be restricted to rather small realities, or so-called small-scale worlds. Based on Beyleveld's experience with the ERP implementation, it was decided to focus on those departments of the Chemical Company that are based at its Head Office in Johannesburg, Gauteng. The company is a large manufacturer of chemical products in South Africa and a division of a larger corporation. Their products are sold locally and internationally. The majority of end users using the SAP R/3 system are concentrated at the Johannesburg office[10]. The company has experienced a massive growth in terms of market expansion and customer base since it was established seven years ago[11]. It started off with a very small personnel component and the leadership style, culture and governance models were very informal. Their market expansion and growth happened very fast and their informal leadership style did not keep up with this growth. During this period the decision was made to implement the SAP system and the changes in the work culture[12] was driven more by the system than the leadership style[13].

Methodology

In order to accomplish the present study's objectives, a methodology was required that would be suitable for investigating the relatively unexplored area of a SAP R/3 implementation. In addition, we wanted to explore the social and cultural environment evolving as a result of the implementation, and particularly how this environment changes the way employees of a South African chemical company perceive and go about their everyday work. The need to explore the subjective experiences of the end users led to the selection of a qualitative methodology since this approach with its unstructured and flexible ability is ideally suited to discover and describe the insider worlds of the end users of which very little, if any, knowledge is currently available locally. More particularly, the present study resembles a qualitative process evaluation of the SAP R/3 system that was implemented in 2000 at its head office. According to Schurink (2003f, p. 4) process evaluation "focuses on the actual activities of a particular programme (system) and its internal dynamics in an attempt to reach some understanding of the programme's strengths and weaknesses".

Qualitative Research and Information Systems (IS)

Myers (2003) from the Association for Information Systems states that since there has been a general shift in research away from technological to managerial and organisational issues in Information Systems (IS), interest in the application of qualitative research methods has increased. He claims that in the area of the design and evaluation of information systems, interesting collaborations between ethnographers (including qualitative researchers) on the one hand, and designers, IS professionals, computer scientists and engineers on the other hand, are taking place. He correctly believes that there is a need in this field to focus research on the people component because of the impact of information systems on both the organization and its culture. He concludes that ethnography (including qualitative research) is very useful for exploring the social and organisational contexts of IS development and its use[14]. Qualitative research, in general, and ethnography, in particular, are very good at answering so-called "w"-questions: "why", "what", "when", "where", and "who". The following views from Myers (11/05/2003) reflect the increasing interest in the application of ethnography in the Information Systems (IS) field:

"After early ground-breaking work by Wynn, Suchman and Zuboff, ethnography has now become **more widely used in the study of information systems in organizations**, from the study of the development of information systems (Hughes et. al, Orlikowski; Preston) to the study of aspects of information technology management (Davies, Davies and Nielsen). Ethnography has also been discussed as a method whereby multiple perspectives can be incorporated in systems design (Holzblatt and Beyer) and as a general approach to the wide range of possible studies relating to the investigation of information systems (Pettigrew). In the area of the design and evaluation of information systems, some very interesting work is taking place in a collaborative fashion between ethnographers on the one hand, and designers, IS professionals, computer scientists and engineers on the other. This collaborative work is especially strong in the UK and Europe and is growing in the US" (Emphasis added).

Other views from abroad on the place and role of ethnography and qualitative research are that qualitative research and specifically ethnographic research are commonly used in business today (Collis & Hussey, 2003)[15]. Further, ethnographers seek to understand the culture of a social system, where the subject makes the first interpretation. This is then "... read and systematized at the second order level by the researcher who writes an ethnographical account for the third order interpretation by the reader" (Partington, 2002, p. 120)[16].

Qualitative Research in Local Management Studies

While there is a general lack of training qualitative research methodology at local higher training institutions, there is an increasing tendency to start utilizing qualitative research for researching life at work that can contribute to the development of this field in South Africa; particularly with regard to the

10 The head office in Johannesburg consists of the financial, sales and distribution, supply chain and logistics, mareketing information management departments. Their manufacturing plants are situated at three different sites in South Africa and their distributing offices are based in Johannesburg, Durban and Cape Town. **11** End users on the system increased from 200 in 2000 to more than 500 in 2003. **12** Work culture in this context is the way employees think about their business and how the value chain of the business is integrated. **13** The reason for implimenting the SAP R/3 system was driven by a strategic decision of the larger corporation as part of their overall globalisation strategy. Business units or divisions had to implement the SAP system. **14** If there is a need to understand how IS is developed and used in organisations, then ethnography is a powerful method since it provides an in-depth analysis of such a process and will enable researchers to answer questions concerning why people don't act in ways thought to be sensible or rational by others (Myers, 11/05/2003). 15 "It provides insight about a group of people and offers us an opportunity to see and understand their world" (Collins & Hussey, 2003, p. 71). 16 "Within an organisation, particularly a large one, there is a pluraity of settings, and multiple frameworks of meaning, but the settings are partial and specialised. The organisational culture is not only researched and described as a whole, as in classic ethnography, but also usually studied in a particular context to understand a phenomenon of interest: (Partington, 2002, pp. 120-121).

research methodology found in the Human Resources Management/Organisational/Leadership fields. Particularly noticeable in South African management studies is that thus far focus groups; repertory grid analysis, unstructured interviews, phenomenological analysis, grounded theory, analytic induction, and discourse analysis have been used.

Account of the execution of the study[17]

Why should qualitative researchers provide detailed descriptions of their various and often minute research decisions in their research outputs? The answer lies in the belief shared by many qualitative researchers that a comprehensive and motivated research account is a prerequisite for the assessment of quality, or as it is often termed, credibility[18, 19]. Before providing an account of the decisions taken during the course of the research, a cautionary note is in order. Providing sufficient detail on the various steps taken during the execution of a particular study in an article is challenging because of its relatively limited length prescription. In this contribution we attempt to provide sufficient information on some of what Beyleveld experienced as key decisions taken during the execution of the research. This does not imply that the many other decisions that were taken but that are not described here are not important[20].

Research focus

Apart from the decisions on what to research and the selection of a research setting, one of the first major challenges was how to limit the research so as to be manageable, yet still encompassing enough of the richness of a particular social reality to allow a valid description and appreciation of it. This particular issue could be resolved relatively early in the study because of Beyleveld's intimate knowledge of the company, its people and SAP. At the time of deciding to undertake the study, Beyleveld had already been in the employ of the company as a consultant for a few years and formed part of the user group. As an insider it was from the outset of the project clear to him which aspects of SAP R/3 at the chemical company deserved scientific scrutiny[21].

Table 1
Participant profile

	Gender	Position	Department
Participant 1	Male	Financial Manager	Finance
Participant 2	Male	Line Manager	Logistics
Participant 3	Female	Line Manager	Export Sales
Participant 4	Female	Line Manager	Asset Management
Participant 5	Female	Supervisor	Accounts Receivable
Participant 6	Male	Supervisor	Sales and Distribution
Participant 7	Female	Clerk	Export Sales
Participant 8	Female	Clerk	Sales and Distribution
Participant 9	Male	Clerk	Financial
Participant 10	Male	Business Process Specialist	IM (Production Planning Processes)
Participant 11	Female	Business Process Specialist	IM (Sales and Distribution Processes)
Participant 12	Female	Business Process Specialist	IM (Material Management Processes)

Selecting colleagues as research participants

A conventional statistical sample frame was not used but instead a mixture of snowball, convenient, and theoretical selection strategies, typically used in qualitative research. These strategies were applied to the company's hierarchal structure, and representatives from this indigenous typology were selected, that is, participants from the clerical, first line management, senior management level and business process specialists in the IM department functioning as employee support, were approached. (See Table 1).

On 20 June 2003, the Financial Manager of the company was approached first because of his seniority in the company as well as his positive yet critical attitude towards the SAP R/3 system. After the initial interview on 27 June 2003, he was asked to recommend other potential interviewees he believed could make a contribution to the study. This snowball technique was followed during the entire data collection phase until all levels of the hierarchy were covered and the data became saturated. The final number of persons interviewed during the data collection phase was 12. After the initial meeting with each interviewee, follow-up meetings were scheduled to discuss any forthcoming issues highlighted during the initial interviews by particular participants. The first four interviewees were interviewed 3 times each to allow for cross-checking the data. The rest of the interviewees were interviewed once only and on average their interviews lasted about ninety minutes to cover all themes if these were not mentioned initially. This process was followed until 17 October 2003 when a point of data saturation was reached.

Soliciting relevant information

An initial meeting with the first interviewee selected was set where the purpose of the study was explained to him. It was explained that since he was part of the initial project implementation as a business process owner and a senior manager, he was familiar with the impact the system had on his department and its people, and that his experience of this could contribute in determining what, in hindsight, had happened, what impact, if any, it had and what could have been done differently. He was finally asked for his views on what the focus for the future should be.

This approach was generally followed with each interviewee. It is important to note that at that point Beyleveld provided time for questions from the interviewees. After this, the informed consent form was discussed. Once the research participants had agreed to take part in the study, the form was signed and the interview started. The only problem experienced was the use of the tape recorder, especially with the first interviewees. The reason for this was not about being exposed, as the trust relationship had already been established between Beyleveld and the participants and the consent form was then signed. The problem was rather the research participants' unfamiliarity with being tape-recorded. To overcome this, the tape recorder was openly displayed during the initial explanation and discussion and recording of the discussion only started once the participant's formal agreement was obtained.

As the data collection approach was largely unstructured (particularly the first interview sessions) subjective personal experiences and views that were confusing or unclear, but were particularly insightful and/or providing clues as to the interviewees' world, were followed up. Initially the interviewees were allowed to think back to their first experience with the system and project team in order to share their experiences of the SAP system and the project approach. The rationale behind this approach was to allow them to talk freely and not to interrupt them. Apart from checking that the recorder worked, Beyleveld took down notes of information requiring further discussion in order to understand their specific lived experienced and particularly the words and expressions the interviewees used. Beyleveld also reflected their views and experiences back to them in his own words to ensure clarity and comprehensiveness. This process was followed until the research participants indicated that there was nothing more they could add. Only then were

17 Generally, researchers reporting on how they carried out their research give much more attention to the many decisions that they took when researching a particular social reality. This comprehensive account often includes what has been termed "natural histories", i.e. comprehensive descriptions of the various research steps in chronological order (Schurink, 2003g). **18** This belief is at least found amongst qualitative researchers from the so-called "scientific moment" (Schurink, 2003g) and Denzin & Lincoln (2003). **19** Credibility is something that cannot be achieved by the researcher since his/her study needs to be accredited by readers of qualitative research outputs (i.e. reports or articles) from information provided in the report by the researcher (Schurink, 2003g). **20** Should any additional information be required, Beyleveld can be contacted. **21** As already indicated, the study is focused on the impact of the SAP R/3 implementation on the social environment and culture of the end users at the Head Office of the company used in this study.

topics or themes covered in the literature and/or by other interviewees introduced and the interviewees were asked to comment. More specifically, the following data collection methods were employed:

(i) Unstructured Face-to-face Interviews
After considering the interview types and many available approaches to interviewing, the definition provided by Schurink (2003e) for unstructured interviews with a research schedule was used. It relates to the general interview guide approach:

> "Unstructured interviews are conducted with the use of a research schedule. The schedule is a guideline for the interviewer and contains questions and themes that are important to the research. Although the questions do not usually have to be asked in a particular sequence, they do ensure that all the relevant topics are covered during an interview. Unstructured interviewing with a schedule or an interview guide is of particular value in a group context. Quantitative researchers have recently also started using unstructured interviewing with a schedule as a form of exploratory research. This allows them to formulate hypotheses which could later be tested during a social survey" (Schurink, 2003e, p. 3).

First interviews were scheduled with the participants during, which the purpose and expected outcome of the study were explained. Follow-up interviews were set up well in advance of the actual meeting. These interviews were conducted on site. During these sessions, the interviews were taped with the consent of the participant. Once a session had been completed, the interview was transcribed either in full or in part. In order to ensure a mutual understanding of the purpose of the interviews, the research goals and objectives were discussed during the initial interview. As at least some trust relationship already existed with most of the end users, Beyleveld did not have any problems with developing a relatively secure relationship with the interviewees. Issues around confidentiality and anonymity were particularly emphasized, and every attempt was made to put the subjects at ease. It was explained to the subjects that Beyleveld's role was to obtain their lived experiences of the SAP implementation uncontaminated. Beyleveld did his best not to either explicitly or implicitly, make any value judgements about the participants' experiences and viewpoints.

Although the approach followed during the interviews was largely unstructured, some guideline or structure needed to be introduced during the initial interview, which generally became more structured during the follow-up interviews. More particularly, the interviewees were, firstly, requested to share any information about themselves and their views and experiences of the SAP R/3 system, second, they were asked about anything unclear in their accounts, and finally, topics related to the implemented system were introduced. Any outstanding and/or illuminating or unfolding concepts and/or experiences occurring in the participants' accounts were taken care of during the interviews and researcher's subsequent field-notes. Any such illuminating and unfolding concepts were noted and discussed in follow-up sessions. This led to a procedure during which patterns in thoughts and experiences were discovered, established and "examined" or validated.

(ii) Human Documents
Beyleveld studied the SAP Steering Committee Minutes kept since the implementation of SAP R/3 by the company and an IM report following an investigation done on the competency assessment of end users of the system. This was done with a view to determining themes and issues, and to compare this information to that elicited during the interviews. In addition, it was decided to make use of solicited documents in the form of stories compiled by the participants in which they shared their lived experiences of the SAP R/3 implementation and subsequent involvement. However none of the participants were eager to write up their experiences and preferred to be interviewed and therefore only unsolicited documents[22] were used. These were the SAP Steering Committee meeting minutes and the report done on the competency investigation by the IM Department. As Beyleveld was a consultant at the firm during the study and thus an insider, he had also been exposed to the system implementation and at the suggestion of Schurink, compiled his own narratives of his experiences of the SAP implementation and subsequent experience of stabilizing the system. These sketches represent a particular kind of personal document, which Schurink (2003e, pp. 10-11) defines as follows, "The life history, autobiography or first-person report is a qualitative data-gathering method that is primarily concerned with a detailed first-hand account of the inner experiences of a particular person, in other words his/her description, interpretation and understanding of the world around him/her".

(iii) Participation Observation
As Beyleveld has been with the company since the implementation of the SAP project, first as Change Manager, and then as Applications and Project Support Business Information Consultant, he took advantage of participation observation. For the purpose of this study, the following definition provided by Fraenkel and Wallen in Schurink (2003a, p. 5) was used, "In participant observation studies, researchers actually participate in the situation or setting they are observing. Participant observation can be overt, in that the researcher is easily identified and the subjects know that they are being observed". The various roles open to the researcher are: (i) full participant; (ii) participant-as-observer; (iii) observer-as-participant, and (iv) full-fledged observer (Schurink, 2003a, p. 8). Owing to Beyleveld's extensive involvement with the SAP R/3 implementation and subsequent responsibility of the system, all interviewees knew him and had an idea of what his role as Applications and Project Support Business Information Consultant entailed. Therefore his role in participant observation was overt and varied between participant-as-observer and observer-s-participant.[23]

Transcribed taped interviews
Parts of the interviewees' subjective accounts were elucidated and in some instances entire tapes were transcribed. The transcriptions were checked to ensure that core experiences and worldviews had not been omitted and/or changed. Finally, these were stored both in hardcopy and electronic format to facilitate analysis.

Field Notes
A written account, field notes, of what was heard, seen and experienced during the interviews was constructed and word-processed as soon as possible after the conclusion of the interviews. The notes took the form of both descriptive and reflective reference. The former representing portraits of the subjects, reconstructions of dialogues, descriptions of the physical setting, accounts of particular events including Beyleveld's behaviour, and the reactions and feelings occurring during the interviews. The latter, as the name suggests, reflected a more personal account of the course of the research in a subjective manner, for example, speculations, feelings, problems, ideas, hunches, impressions and prejudices[24]. In the process of compiling the field notes, Schurink's (2003c) typology (a revised adaptation of the scheme developed by Schatzman and Strauss (1973) was followed.[25] These are notes on reminders, instructions and critical comments. These field notes enabled Beyleveld to make preliminary analyses that he verified in subsequent data collection and finalized at the end when he was involved predominantly in data analysis.

22 All potential participants that were approached said they would prefer the interview setting to express and convey their experiences and perspectives. **23** Many informal discussions Beyleveld had with people and the interviewees during particpant observation were noted and added to the field notes. **24** In compliance with Schurink (2003d, p. 9), these notes reflected (i) analysis, (ii) method, (iii) possible ethial dilemmas and conflicts, and (iv) Beyleveld's state of mind. **25** This implied that the contents of the notes included (i) observational notes (ON's), i.e. notes on what happened with little if any interpretation provided, (ii) theoretical notes (TN's), i.e. self-conscious, systematic attemps to derive meaning from the ON's, and (iii) methodological notes (MN's).

Data-analysis

Focusing on all three focus areas[26] of ERP implementation Beyleveld attempted to describe, understand, and explain the subjective views and experiences of the research participants (the etic approach). The data of each interviewee's accounts as per his field notes and memo's were first sifted according to these three main areas after which they were sub-divided into different categories facilitating the establishment of specific trends and patterns. Once this was done, Beyleveld grouped together relevant topics of all interviewees and, from his understanding, gave each group a collective name or heading. He then proceeded to make further deductions and interpretations. While no systematic qualitative analytic method was used the preceding activities bear a resemblance to grounded theory and analytic induction.

Credibility/true worthiness of data

While no fast-and-hard rules exist to guide qualitative researchers in doing qualitative research, some guidelines have been developed which can be used to accomplish qualitative or credible qualitative research. **First**, possible disturbing factors[27] were anticipated and an effort was made to minimize them. **Second**, in the compilation of the field-notes, Beyleveld tried to reflect on these effects and his attempts to curb them. **Third**, to assure the participants' candid cooperation in the study, Beyleveld spent considerable time on the topicality, nature and aim of the research before he asked participants to share their views and experiences. **Fourth**, the participants were assured that they would remain anonymous and that everything they would share would be treated confidentially and used for research purposes only[28]. **Fifth**, to compensate to some extent for the negative effects of each particular method of data collection, ***triangulation*** was used, i.e. applying multiple methods of data collection. **Sixth**, to the extend that Beyleveld's approach was reviewed by Schurink, and other examiners "peer debriefing" was used. **Finally**, so-called member-checks were employed, i.e. by providing the analysis and interpretation of the material obtained from the participants to them and requesting them to comment on it.

All participants involved in the member-checks commented that the findings, conclusions and recommendations were in line with their own experience and no comments were received that differed to what was presented to them. They regarded the study as comprehensive in terms of the topic being investigated and also as very informative as far as the findings and recommendations were concerned. They agreed with the finding that the real issue centred on the people issues and not the technical solutions. They were further of the opinion that companies considering implementing an ERP or had already been through an ERP implementation should consider the findings of this study as this will assist them in enhancing the productivity of the system. (See Table 2).

TABLE 2
MEMBER-CHECK SUMMARY

	Gender	Position	Department
Member-check 1	Male	Line Manager	Logistics
Member-check 2	Female	Line Manager	Export Sales
Member-check 3	Female	Line Manager	Asset Management
Member-check 4	Male	Supervisor	Sales and Distribution
Member-check 5	Female	Business Process Specialist	IM (Sales and Distribution Processes)
Member-check 6	Female	Business Process Specialist	IM (Material Management Processes)

Ethical problems are particularly challenging when conducting qualitative research and the present study was no exception. The study inevitably delved into the social lives of the end users taking part in the study, which led to the concern that such an intense study of subjects' lives might cause them harm. While it would be presumptuous to claim that the participants experienced no harm, we are convinced that Beyleveld acted scientifically responsible[29]. Finally, there exists the possibility of emotional stress on the part of interviewees by participating in the research and being requested to sign a consent form.

FINDINGS

As is to be expected from a qualitative study a large amount of rich data was generated. The data represented (i) views and experiences solicited from end users interviewed, (ii) statements and descriptions found in human documents both unsolicited (company minutes, etc.) and solicited ones (researcher sketches). Naturally, all these data cannot be presented in an article. Consequently, in this section the most relevant and/or illuminating subjective experiences and viewpoints are presented by presenting relevant information obtained from the various data collection methods. This is done according to common themes found in the data as well as their relatedness to the methodology of the Accelerated Systems Applications Products (ASAP) methodology's main focus areas, namely business, people and technology.

People-Centered Process

New Culture

All interviewees referred to the way the culture of doing business had changed due to the SAP implementation. They used explanations such as *culture, new way of doing business, business culture, dependency on the Information Management Department, different culture and method of working.* The entire group of end users participating in the study (12) mentioned this issue without being prompted. The higher levels of management focused on the strategy of business processes while the lower levels focused more on the influence the current processes have on them. The following are some of the verbatim comments on this theme:

A **female end user** involved in the system for the past three years commented: "*People still see this is my job and the rest is not my responsibility even though the system enforces a new way of doing your job*". A **male line manager** that was also part of the implementation team noted, "*That's the culture here, most people are just here to earn a salary and there is no ownership for the system or the information that I need to manage*" (Our translation). A **female line manager** working on the system since it was implemented stated, "*The culture issue was not dealt with properly and now people are forced to change their way of doing and thinking about their job*".

This culture issue was also evident in the investigation that was done by the IM department on the competency level of end users as stated in the report on this issue in January 2002.

From the above, it is clear that the interviewees expressed a need for the following:

- An understanding of how the system can drive business and not work against them.
- Greater understanding of how business operates in general but also as to their specific environment.
- Fostering a culture of disciplined integrated functional teams to ensure process thinking and not trying to enforce a culture by introducing the system.
- A definition of clear roles and responsibilities over process and not with regard to functional areas alone.
- Clearly defined and documented business processes.

26 The focus areas of a SAP R/3 implementation are Technology, Business Processes and People.
27 For example, in preparation for the interviews, Beyleveld generally tried to forsee factors that could be related to the study, the particular participant, focused interviews, and also his own duel role, namely that of colleague and researcher. **28** Particularly challenging was to convince them that their accounts would under no circumstances be revealed to the executives of the company. **29** As already pointed out, before any information was solicited from any participants, they were provided with quite a comprehensive explanation of the aims and the nature of the research allowing them to assess any uneasiness or stress their participation might cause.

It is further clear that while the SAP system introduced a more systematic and integrated way of doing business the organization was not aligned to this kind of system and process thinking. In the previous model of business where the departmental division was more applicable, it wasn't necessary for users to understand or to be aware of other departments since the focus was mainly on their own immediate department and its process. The SAP system compelled end users to start thinking wider than their immediate departmental boundaries. Neither the project implementation team nor the organization through its leadership or its business process re-engineering, prepared either the business or its people for this new way of thinking. Also clear is that the process that was followed to try and force the ERP system to match the existing business process did not result in the desired outcome. This in turn, gave rise to ongoing customization that is currently hampering the stabilization process. Furthermore, the people in the organization were not prepared for an integrated business process-thinking model before the new system was introduced. This was further complicated by a lack of leadership focus or involvement as will be indicated subsequently. From own experience, Beyleveld believes the philosophy and methodology of ERP systems to run across existing processes, hierarchies and functional divisions in an organization are creating continuous change.

Thus: The new way of work or business culture that is emerging is one of teamwork and/or process thinking. People need to be developed in teamwork across functional hierarchies. Performance and success in an integrated process-orientated environment is not only the result of individual talents but also the effort put into the processes between individuals of different teams across functional hierarchies. This is clearly being brought forward by an ERP system like SAP and this change in work culture of moving away from a departmental focus to a process orientation is one of the difficulties of implementing an ERP system.

Management Involvement
Once again all participants referred to senior management and line management's lack of involvement in the project implementation and the system itself. The following are some of the verbatim comments:

A typical comment from a **senior male member** of staff was: "*Management and leadership must change so that discipline can be enforced and to be able to manage it (information) and they need to get involved in the system from the start otherwise the system will not operate*" (Our translation). A **female system support staff member** noted: "*Senior management has no ownership of the system as they do not know or understand the system and its capabilities at all*". A **female supervisor** stated: "*Senior management does not see the system as a management system but as a system for processing transactions*" (Our translation) A **male line manager** commented: "*Management that makes the decision is not the management that is involved in the day-to-day operations. Management only pays lip service, they cannot educate staff when they do not understand themselves*".

It is evident that the end users experienced the lack of leadership as part of the problems experienced at present with the system. In addition, the participants were also of the opinion that more involvement of these levels of management would ensure ownership of the system as well as easier adoption of business processes[30]. As Gunson and Du Blasis (1999) noted with most ERP implementations, it was once again evident that management did not realize that an ERP implementation necessitates an implementation across the entire enterprise and therefore needs greater involvement and commitment from top and senior management.

Business process understanding
Business process understanding seems to be crucial[31]. It is interesting to note that only senior level end users recognized this. The lower level interviewees did not initiate this topic suggesting that it was not regarded as being important in their everyday working experience. However, when prompted on this, it was interesting that only one of the lower level participants did not regard it as important. This particular **female member of staff** believed that it was not necessary to grasp the complete business process since all that was important was to focus on one's own job: "*I do not see why I should understand a business process because I am not interested in what other people is doing and how I am affecting them. All I am interested in is doing what I am responsible for*". Other comments made by a **senior manager** and **female line manager** respectively were: "*Very few people understand business processes and still want to operate in silos*" (Our translation). And: "*People know what they need to do, but not why they are doing it because they do not understand the business processes*".

Project team structure/selection
Again only management level brought this matter to the fore. The lower levels did not regard it as important or relevant. Neither did the people who were interviewed that are part of the IM Department and representing the project implementation team.

A **female line manager** remarked: "*It was a project run by "other" people; they did not start with the people who were affected by the project. The business people were involved in the project drawing up blueprints and processes for jobs they have never done and because of this management lost the buy in as they had no credibility. Also people that were taken out of the business were not involved in the business process, therefore the wrong people were placed on the project team. This resulted in the team not knowing enough about the business. The choice of team members must be people that are well aware of the business, does not matter what level in the business they are, but they must be people that has credibility with the rest of their team members, that can influence the rest of the team to accept the new process*".

Material gathered by means of the other data collection methods did not reveal any experiences and views with regard to project team structure/selection.

Training
Here interviewees commented on the operational aspects of the system, and the functional knowledge and training required. It is clear that there was consensus among the research participants that the transactional training was adequate for people involved in the project, but that they generally lacked the inherent understanding of the system and how this linked to the integrated nature of the organization's business processes or value chain. This resulted in end users experiencing difficulty in managing processes across functional areas and executing problem-solving on the system. The timing of the transactional training also seemed to be a crucial factor and should be conducted just before the "project go-live" phase of the implementation process.

A **senior manager** noted: "*Individuals that were not part of the project implementation team do not have insight into the system and for this reason the functionalities of the system are not investigated and fully used*" (Our translation). A **male supervisor** commented: "*Overview training of the system and the processes should have happened earlier and transactional training later. We never had business process overview training so we need to let the people know how the business work and how SAP is aligned to map the business*".

The SAP steering minutes referred to training on numerous occasions but senior management interpreted the problem as a lack of transactional training even though the

30 This theme was not observed in any of the other data collection sources. **31** This issue was also identified and noted in the investigation done by the IM department in January 2002.

IM investigation found that the problem did not lie with transactional understanding but with process understanding instead.

Business Process

Continuous Business Change

The constant change due to growth and expansion had definitely influenced the project implementation and subsequent stabilization of the system in at least a number of ways.

A single participant, **a senior manager**, felt that the changes effected were sufficient to support the structure of an integrated system, whereas the remainder of the subjects who commented on this matter felt that the changes were too rapid and that too many things happened simultaneously, and that the culture was not prepared with regard to all these changes to support an integrated business management tool such as an ERP system. The system is then exploited to change the culture. The **senior manager** commented: "*Owing to changes in the business the organization structure was changed to be supported by a system such as SAP in terms of a management matrix. The system introduced controls that can be used by management to manage the business*" (Our translation).

Due to the rapid changes the business processes were continually changing. This resulted in the inability of the system to keep track of these transformations. As a result, the responsibility of keeping the system and related business process on the system up to date resided with the IM department. This, once again, refers to the lack of ownership in the business to utilize the system to drive its business. A **male business support staff member** said: "*Also the company has grown so much and so fast that what was applicable and relevant in the beginning of the project was not valid any more*". A **female supervisor** commented: "*Too many changes happen too fast, we were barely live with the new system and then we had to upgrade to a new version again*" (Our translation).

End users from more senior levels in the organisation appeared to be more at ease with the changes. A possible explanation could be that they were part of the decision processes accompanying all major changes or they generally had a better understanding of changes in the market environment. It appeared as if middle managers and junior staff were suffering from 'change fatigue' resulting in them not necessarily being committed to new changes. They tended to regard changes as temporary since they believed these depended on management's ever changing ideas. The following comment of a **female clerk** summarized this point of view: "*We are going through too many changes at the same time and also on a continuous basis, once you get one side right, another change happens in the business that influence everything and you are just getting tired of this constant adoption to new changes*".

Continuous business change was not addressed in the SAP Steering Committee minutes although it was referred to in the IM report stating that people regarded changes as happening too frequently and that a new management whim would soon surface again. This topic was found in all the research participants' accounts. It was only the people in the IM department that felt that the changes in the business did not affect them so much. This could perhaps be explained by their being part of the change implementation process.

Business Process Design

When inspecting the material solicited from the end-users, two main concerns stood out. First, when implementing an integrated system it is necessary to define and clarify business processes across functional hierarchies. All the interviewees were of the opinion that not enough was done to clarify the essence of the integrated business processes and subsequently to redefine policies and procedures. The following excerpt from a **senior female business support member** is particularly illustrative:

> "*Business processes were not aligned in the beginning and it was not really integrated. The technology gave structure to the business processes and made it easier to identify the areas in the business process that needed enhancements or redesign. The lessons learned are: define business processes from the beginning in terms of the complete value chain taking the integration points into account, involve all the departments involved and detail everything, involve all people, from designing to testing and accepting the new solution. Also policies and procedures must also be defined and documented from the beginning.*"

Second, the participants believed that the different functional departments were only thoughtful of and focused on the process that affected them directly and what was important to their immediate environment. They did not take advantage of the opportunity to streamline or redesign processes to facilitate and integrate process flow. Most of the issues experienced with regard to the system after having gone live had to do with these interdepartmental integration challenges. As an ERP system, such as SAP, automates processes across functional boundaries and processes, both the business and the project team seriously neglected this area. A **male line manager** who was also part of the initial project implementation team put this as follows:

> "*We made a mistake by trying to map the way the business was operating. We needed to define and clarify the business processes and rules and ensured that this was documented. The rigidity that is now experienced with the system can be overcome if we re-think and adjust our business processes, this implies that the people in the business must get involve and document their business processes. But because of the level of people that gets involved with the implementation solution a misalignment of the business becomes the truth and people are only concerned about their own processes and are not aware how they affect the rest of the business*" (Our translation).

Business process design was also identified by the IM investigation that was done, reported and published in January 2002. The SAP Steering Committee also identified this as an area that needed to be addressed, but once again they were looking at the IM department to provide a solution for competency level improvement. From the first author's experience, these two issues caused the biggest challenges as the business processes across functional areas did not truly integrate and neither were business rules or processes properly documented from a business perspective. This caused a lot of frustration, miscommunication and misunderstanding at all levels affecting the productivity of the system.

Technology Process

Project implementation process

Only one senior manager commented on this matter. The remainder of the subjects did not find this topic relevant for discussion since they believed that the process of project implementation had been executed well. The **female line manager** made the following comment:

> "*The mindset for implementation was not right. This is the mindset of management that agreed to the project. They should have gone to the people, they should have initially spent more time on the buy in from the lower level staff and this should have been done by management, not the project team. T-shirts, posters and communication was nice, but did nothing to change the mindset and prepare people for this huge thing that was forced down on them it*

only helped to create awareness, but it did not look at the target market. The project implementation team was completely distant from the business and they never asked the business what they want, they should have moved closer to the business."

The project implementation process was not discussed in any of the other data information resources, but it seems to have validity in terms of the project implementation process and a redesign of this process.

System characteristics

A feeling among the more senior members of staff who took part in the research – again the lower levels subjects didn't regard system characteristics as important – was that more effort should have gone into making people understand what the system was all about. A **senior male manager** noted, "*The system is user unfriendly; if you process something incorrectly the process must be reversed in sequence to solve it. This takes time and results in people bypassing the system*" (Our translation).

A **female line manager** noted the following: "*In the first year the system was seen as an inflexible system, people did not have enough understanding of the functionality of the system and it was seen as something that forced down rules. We should have had a more psychological implementation instead of a technical implementation explaining the philosophy of an ERP system and that this is more advanced than just excel and word and e-mail. After a year of working on the system this perception has diminished and people now focus on where they can streamline or enhance the process*".

From Beyleveld's experience, we feel that the following two possible explanations of the different views on the role of system characteristics are fair: (i) the lower level participants are using the system on a daily basis resulting in them being more at ease with its functionalities, and (ii) senior management participants do not understand the system since they are not actively involved in it; consequently they still experience the system as intimidating or overwhelming. The only unexpected findings were those with regard to the project team member selection and the project implementation process. Other than that, none of the other comments were seen as unusual from the researcher's experience in the company and working with the system.

In concluding this section it seems that the impact of a SAP implementation has definite consequences on the underlying culture of an organization. Organizations implementing an ERP system should consider developing their silo-based culture to a process orientated culture. This should be driven by a strong leadership focus and engagement and supported by the creation of solid business understanding and the development of the necessary core business competencies and capabilities. This would ensure a higher productivity as the system would be used as a business management tool to drive business information and thus assisting in strategic decision-making. (See Figure 1).

DISCUSSION[32]

It is important to re-emphasize the explorative and (to some extent) descriptive nature of the present study. Information was obtained about how a group of end-users of a SAP implementation at the Head Office of a particular South African company in the Chemical Industry (and over a particular time span) experienced this technological business innovation. Employing qualitative methods of participant observation, unstructured interviewing, and documentary sources, valuable initial insight was obtained into the implementation process as well as the resultant culture.

It seems that the biggest impact was experienced in the area of people processes, followed by business and, finally by technology. It is clear from the findings that the impact of a SAP implementation has a significant impact on both the people and cultural issues of a business[33]. As Schneider (1999) points out, implementing an ERP system is not about the technology but about reinventing the business and companies pay tremendous lip service to the people and cultural issues. From the study it is further clear that it was the experience of the subjects that the introduction

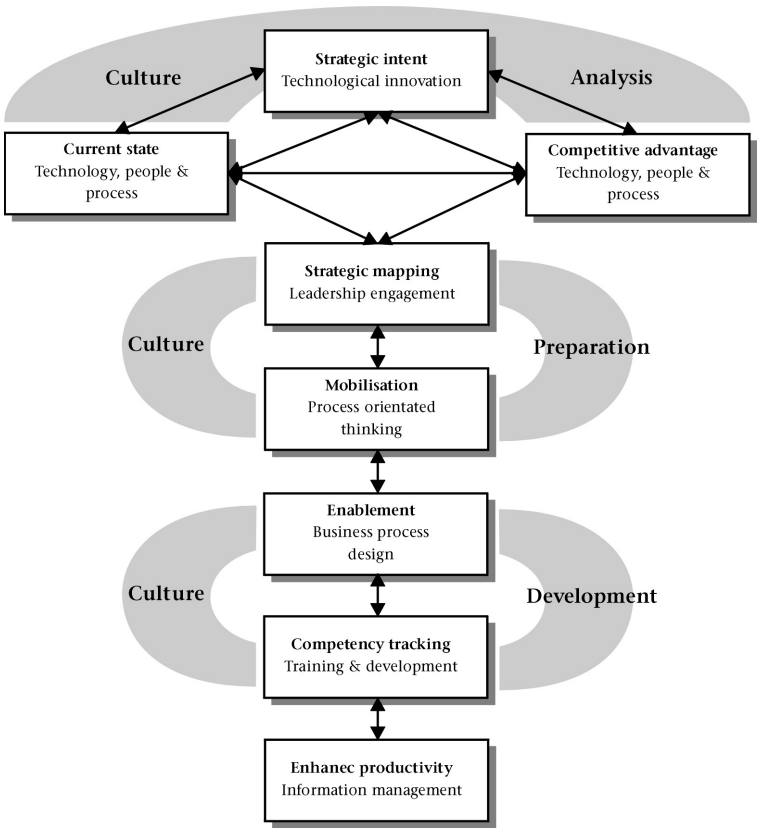

Figure 1: High level summary of core findings

32 In this final section, conclusions, which were inferred from the information gained from end users' subjective views together with relevant existing research findings and scholarly views, are presented. In addition, based on the process evaluation of the SAP R/3 implementation effected by the study, suggestions are made as to future implementation and/or productivity enhancement of this particular technology. 33 As Laughling in Gunson and de Blasis (1999, p. 6) state: "ERP implementations do not fail because the applications do not work, they fail because the enterprise rejects them".

of the SAP system had forced them to think differently not only about how they do their work but also about how the business is functioning. As Nel (2002) comments, the effect of technology has a profound impact on both the organization and its behaviour and therefore the culture of the business.

Further, referring back to Schneider's (1999) comment on management paying lip service, all the research participants felt that the lack of management involvement in the implementation of the system during the project implementation and thereafter did not contribute meaningfully in making the transition from a silo based business approach to an integrated business approach. Culture aspects were ignored and there was a lack of management involvement in the implementation. This situation led to the change process being a substantial contributor to the constant conflict between the new processes and the old ones. Donovan-Wright (2003) and Meyer and Botha (2000) refer to this aspect and describe this as resulting in the system becoming the driving force behind cultural change.

Organisational development and the fostering of a new way of thinking and doing business and therefore a new business culture, should start well in advance of project implementation. Gunson and de Blasis (1999, p. 10) state: "One difficulty in implementing ERP is this switch from a functional to a process orientation, due to the fact that modules cut across traditional departmental lines. There is a value to educating all stakeholders not just end users – there is no right way to implement an ERP system but that active and engaged leadership is vital".

Leadership from top management and line management is essential in driving the new culture emerging from the inherent philosophy of an ERP system, by moving away from silo based business thinking to integrated business functionality. It is clear from the present study's findings that management tended to shy away from getting involved in the system not only during implementation but also when using it to manage and control their business processes. This inadequacy was due to a lack of understanding of the system, resulting in them not being proactive in adjusting the integrated business processes. Also, the subsequent exclusion of the Human Resources Department and specifically the Organisational Development function led to the ERP system just becoming another IT project implementation and not an enterprise implementation.

Taylor (1995) made it clear that the introduction of new business processes has brought about a loss in productivity during the first few months of an implementation. Axelrod (2000) points out that new internal working relationships need to be created to ensure a minimum lost in productivity. It is therefore clear that involvement by leadership is of paramount importance. Thus apart from a revisit of business processes, new roles and responsibilities need to be developed. Davenport (1999) explains that a continuous re-skilling of the right people capable of performing computer tasks and managing information is required to ensure acquiring the skills and knowledge for a competitive advantage. Leana and Barry (in Gunson & de Blasis, 1999, p. 7) comment: "... organizations and individuals are increasingly pursuing change in how work is organized, how it is managed and who is carrying it out. The advantage of change to the organization is the ability to quickly adapt to environmental changes, explore new ideas or processes, reduce fixed costs, and in the end have an advantage over competitors". They quote Laughlin who claims, "You will underestimate and fail to appreciate the degree of change an ERP solution causes" (1999, pp. 5–6).

From the preceding the following **recommendations** seem apparent:

First, ownership from leaders is required; it must be demonstrated by their commitment to the ERP system as the technology or innovation to drive business processes and information. Such expression will facilitate buy-in from the more junior levels in an organization and will, in turn, result in less distressing clarification of system and process related issues. Ownership of and commitment to the system by leaders should accelerate the distribution of information in the system that would result in system stabilization and the smoother integration and alignment of business processes.

Second, in order to drive performance and improvements, management should ensure that they understand the processes affecting them directly as well as the functioning of the system. Due to the lack of management involvement, the junior staff levels in the organization understand its business and processes better. This state of affairs makes it relatively easier for junior level staff to pull wool over the eyes of their superiors.

Related to the preceding is the necessity for management to manage the integrated business processes. To ensure continuous performance and the support of the business by the system without becoming its driving force, roles and responsibilities of the respective actors need to be clarified. In addition, Key Performance Areas (KPA)/Key Performance Indicators (KPI), which are in line with the process, needs to be developed. Finally, discipline needs to be enforced by documenting relevant business rules and procedures. There is undoubtedly a need for leaders who have vision and focus on continuous business improvement and competitiveness to ensure a more successful ERP implementation. Management should see system implementation as an enterprise implementation and not an IM realization.

Third, due to the ERP system forcing a process of thinking across functional hierarchies, it follows that there is a need for understanding business processes better. Closely related to this is the clarification of roles and responsibilities to ensure that all actors understand the impact they have on process and how this is affected by the system.

Fourth, in terms of the selection of implementation team members, two points are of importance:

- **The selection of business representatives**. It is necessary to appoint people from the business with the necessary experience of the business processes they represent to the project team. Although one interviewee indicated that such individuals should be senior people the remainder believed that they should be people who have experience of the relevant business processes since this will ensure credibility and ultimate acceptance of the technical solution developed to represent the business process.
- **Technical consultants**. They should be people that understand both business and the system. Furthermore, consultants should have the ability to understand the true requirement of business and not forcing down a technical solution only they understand. Put differently, consultants should have the ability to find technical solutions to the core needs of the business; to facilitate a solution that is suitable to the business. The end users that took part in the study believed that the consultants use mostly a technical jargon that individuals working in business generally don't understand. This often results in proposed solutions that are technically clear to the consultant but don't necessarily reflect the core business process and/or need.

Fifth, training in ERP systems should focus broadly on two levels. The integrated business process overview understanding and consideration must be given to a business simulation to demonstrate this and in addition it must focus on cross-functional areas. Furthermore, training should include individuals from the different functional areas representing a complete value chain. Only once this

understanding has been acquired should the focus turn to the transactional training of the system i.e. how to capture the data on the system.

As far as business process design is concerned, it seems necessary to consider the importance of internal business process clarification where current processes should not merely be mapped onto the system. These processes should be revisited and seriously questioned to establish if a redesign of business processes should not be considered instead of merely just mapping existing processes that are not necessarily effective for an integrated business management tool.

Finally, once processes have been clarified, they should be documented (particularly their governing business rules and policies). Such documentation should allow for better understanding and should assist in procedures where business processes – both in the business and with regards to the system – have to be enhanced. In addition, there should be a greater focus on training people who work on the system so as to understand the organization's business processes and especially how the ERP system is linked to these. There seems to be a real need to explain the philosophy and methodology of an ERP system in more detail upfront during project implementation.

While this exploration of the subjective experiences of end-users of SAP technology at a particular business in Gauteng, South Africa, has various implications for other business both locally and abroad experiencing technological implementation, the following are particularly evident:

- **Scientific/academic implications**. With regard to the local field of (human resources management/organization/ leadership/information management studies), this study has made modest theoretical and methodological contributions. As far as **theory** is concerned, the facilitation of social constructionist theoretical constructs provides a first exposure of the social and cultural impact of SAP R/3 systems on a local organization. It illustrates the great potential locked up in theoretical concepts that elucidate how people construct and assign significance to realities and problems in their everyday work situations. Furthermore, this insight in concrete experiences and perspectives of authentic people holds promise for the development of skills, and capabilities required by SAP R/3 system end users. The **methodological** contribution of the present study lies first and foremost in: providing a framework by means of which qualitative and ethnographic methods in the local HRM/IS fields can be applied to generate non-statistical information on leaders' and other role players' subjective experiences and perspectives. It is conceivable that further practical experience with this unstructured approach could made at least a humble contribution to the methodology of local leadership and related human resource management studies. While the procedures followed in the study need to be explicated somewhat more, they provide parameters for a toolkit for qualitative programme evaluation, which is a fast developing area in the country (Schurink, 2003g)
- **Practical contribution**. The practical implications of the study for local organizations exposed to technological innovation are varied. Firstly, a model was developed to effect management change focusing on ERP implementations and not emphasizing technological implementation, but taking into consideration the wider organisational development dynamics. Secondly, having constructed a competency matrix for ERP system end users for a particular local company provides a baseline that could be adjusted to the specific situation and needs of other companies, which implement ERP systems. Finally, the present study offers a cultural model to local companies wishing to develop, or already implementing ERP systems.

As this study focused on the impact of organisational culture in a particular Chemical Industry company, it is foreseen that the results would be relatively easy to assimilate and apply to other companies in South Africa and abroad, owing to the dynamics of the SAP R/3 system that essentially stays the same no matter where it is implemented. Therefore, we are of the opinion that information and insights gained from the study with regard to organisational culture and its influence on change and leadership can be adopted with no real trouble for specific organizations and their environment.

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