

## **Information and Business Process Equality: The Case of SAP R/3 Implementation**

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### **Abstract**

The emergence of SAP R/3 technology has created an opportunity to ensure information and business process equality both at organisational and global levels. SAP R/3 serves as a catalyst for information integration within and beyond the organisational scope through its standardised software modules, while at the same time working as a vehicle for transferring best practice business processes. This paper reports on a case study of a failed implementation of SAP R/3, in conjunction with business process reengineering (BPR) efforts, at a major Middle-Eastern manufacturing company. Both situational and contextual climates of implementation are described and analysed. Lessons in terms of factors that led to failure and their future implications are discussed in the light of the contrasting experiences of several best practice companies. The central theme of the paper argues that establishing process and information equality through SAP R/3 is highly dependent upon the approach followed to redesign core business processes, as well as the extent to which they have been integrated with other business components.

### **1. Introduction**

Today, while information technology equality is an increasingly major concern world-wide, many organisations are still looking at ways to ensure equality of information flow between their internal business units and within their boundaries. They do so by attempting to integrate dispersed IT systems and share one single facet of information across the entire business. However, a prerequisite for this is an integrity being established into business processes through building a process-based IT infrastructure for timely and reliable information processing, setting a set of integrity rules, and enforcing common standards that guarantee data availability and reliability (Al-Mashari and Zairi, 1999a). SAP R/3 appears to be the technology most qualified to fulfil these needs and more, by being able to extend the information flow to reach global locations, while at the same time ensuring a high degree of data consistency and reliability. In doing so, it closes the gap in IT practices through its standardised software modules, and thus enables an enormous degree of connectivity and inter-operability within and beyond the organisational scope, facilitating many of the pressing demands of globalisation. It also closes the gap in business practices by working as a vehicle for transferring the best practices that originally served as a basis for the design of its generic processes. Therefore, SAP R/3 is an appropriate technology for both information and process equality.

SAP, a software company based in Germany, has emerged as the dominant leader in client/server enterprise resource planning (ERP) systems and is now one of the most used standards to change business processes (Bancroft *et al.*, 1998). Originally, the demand for ERP systems was triggered by the advent of client/server computing, combined with the

increasing application of business process reengineering (BPR) to address changing business imperatives (Earl, 1997).

SAP R/3 brings together several core business functions, such as accounting, inventory, and sales and distribution, into one integrated data model to provide for one-time data entry and the sharing of a fast, seamless access to one single facet of information (Rick, 1997). SAP R/3 was developed from the perspective of a corporation as a whole. Its design has distinguishably demonstrated several key concepts (Bancroft *et al.*, 1998), including:

- On-line system with no batch interfaces,
- One single database for all corporate data, without any redundancy,
- Clear definition of a data model documented in a data dictionary,
- Software functionality configurable to different customers' needs,
- Client/server architecture, and
- Best practice and standardised business processes.

SAP R/3's architecture consists of three main layers of software (Figure 1). These are (1) SAP graphical user interface (GUI), representing the presentation layer, (2) SAP application layer, and (3) SAP database layer (Bancroft *et al.*, 1998). These can be distributed according to specified structures and connected through a network to make them operate as a whole. The SAP GUI, which runs on the end-users' PCs in the business departments, has three main responsibilities: (1) presenting all data to the end-users; (2) creating all GUI components, such as windows and buttons, and taking on all user inputs; and (3) communicating all user requests and inputs to SAP applications across the network. The SAP application contains all the processing procedures for the business data represented by several software modules, such as finance (FI), sales and distribution (SD), material management (MM), and production and planning (PP) and many others. The SAP database is interfacing software, i.e. retrieving and storing, with a third-party database management system (DBMS) such as Oracle or Informix.

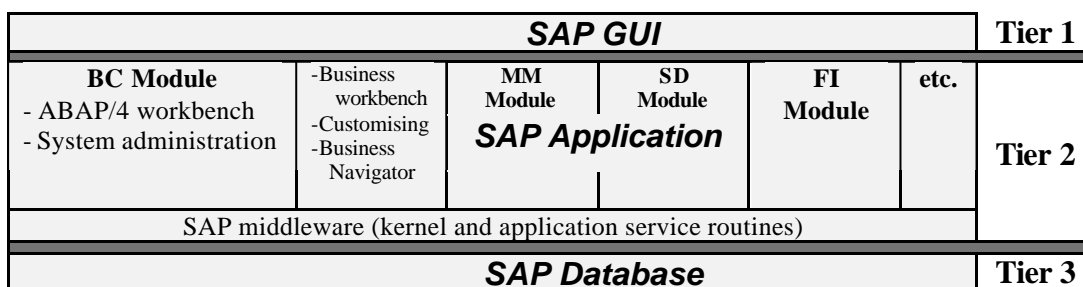


Figure 1: SAP R/3 software architecture (from Bancroft *et al.*, 1998)

In describing the enormous benefits that the SAP R/3 software can bring to organisations, Martin (1998, p. 149) states:

*“The appeal of such an integrated information system to big companies is clear. The sales force enters an order on a computer and the transaction ripples through the entire company. Inventory lists and parts supplies are updated automatically, world-wide. Production schedules and balance sheets reflect the changes. Best of all, every employee has just the information necessary for the job at hand. Feedback cycles are positive and fast.*”

*Salespeople can promise firm delivery dates and managers can gauge almost immediately the effects of decisions affecting credit terms, discounts, inventory or supply-chain management.”*

However, not all organisations embarking on SAP R/3 implementation realise these benefits (Bancroft *et al.*, 1998). Rather, they experience lengthy delays in rollout, budget overruns, inconsistent or incomplete installations and, therefore, lower benefits than hoped for. The reason is that, unlike many software installations, SAP R/3 implementation is a difficult undertaking in that its success necessitates managing adequately a complex context, which involves organisational changes across various key areas related to strategy, technology, culture, management systems, human resources, and structure. The exclusive focus on technical aspects, at the cost of change management elements, has proved to be a major source of failure.

This paper describes a failed implementation of SAP R/3, in conjunction with BPR efforts, at a major Middle-Eastern manufacturing company, Manco (a pseudonym name) Group, which represents a network of complementary companies (Manco1, Manco2, Manco3, and Manco4). The analysis of this case study is based on data and information gathered from a series of on-site interviews with managers in charge of the efforts, and observations and notes. Based upon the premise that BPR and SAP R/3 are interdependent, in the sense that BPR must be supported by integrated and process-oriented IT systems such as SAP R/3, and that SAP R/3 implementation forces BPR, the following discussion refers to BPR and SAP R/3 implementation synonymously.

## **2. Initial Situational Climate**

In 1993, Manco Group faced new challenges driven by the growth of intensifying competition. Changes in the world of business and the threats and opportunities of globalisation created additional pressures. Manco Group also recognised the increasing need to become a customer-focused business, and the huge impact that this would place upon the current organisational structure. Another important reason for change was to improve quality in order to provide cost-effective, flexible, reliable and timely products and services to clients. The Manco Group looked at ways of reducing costs through the elimination of overlapping activities, inefficiencies and redundant manpower. The company had been conducting business for more than 17 years, and many of the procedures and functions in use during that period had become outmoded, calling for a radical change across the board.

Since the early years of its establishment, some of the company's major operations, such as production, sales, shipment, and inventory, had been supported by one application system written in a third-generation language, COBOL, and running on a super-mini NCR operating system. There were also a number of loosely coupled departmental and application-specific piecemeal systems. Accumulating alterations to these systems had resulted in problems such as complex code, data redundancies and poor documentation, and hence in enormous maintenance costs. In 1991, Manco began to migrate some applications systems to an Oracle Database environment, and expanded them to handle more business functionalities. This resulted in little flexibility within the internal architecture of the system, making it hard and costly to increase its capacity to support business operations.

On the other hand, Manco recognised the need to increase empowerment, accountability and ownership by decentralising its activity to points where they can most effectively be carried out. A study of the current organisational structure of Manco2 showed that, with the current

organisation chart supporting between 55 and 60 positions of Manager and above, there was an opportunity to remove 10-20% of these positions. The managerial positions identified as unneeded were found responsible only for mediating the flow of information between the top and the bottom echelons of the organisation, and thus affecting negatively both business productivity and quality.

At that time, there was a strong case for changing the Manco Group's business. Management realised that the key to achieving the change would be to revamp the current outdated IT infrastructure and migrate to a new, flexible application system that would empower its business operations and make them more responsive to customers' needs.

### **3. Start-Up Activities**

In 1993, a survey was conducted to determine which were the most experienced companies who would be able to assess the Group's situation and develop a complete solution package. Six consulting companies were selected and invited to study the case. One of the proposals put forward was to embark on BPR which, at that time, was a "buzzword", and many companies had begun to implement it to improve their businesses.

The Manco Group management recognised that merely changing the current application system would not greatly benefit the company. Thus the idea of BPR and an appropriate IT package to support the change effort came at the right time. A decision was made to implement a new system in conjunction with a BPR effort. Early in 1994, a leading business and IT company (Bitco) was selected by top management to provide support on technical and methodological aspects of BPR. In March 1994, Bitco reviewed the current systems and operations and identified the major problems to be tackled in the BPR initiative.

As changing the IT infrastructure was seen by Bitco as a key determinant of the amount and scope of the efforts needed to carry out the entire BPR initiative, a particular focus was initially placed on assessing the current IT infrastructure. Bitco identified shortcomings in the current IT infrastructure in four main areas, namely network, organisation, platforms, and applications and data (Table 1).

As a result of this assessment exercise, Bitco proposed two main alternative IT infrastructure sourcing approaches to improve the company's operations, namely upgrading current systems, or selecting a world-class package. Based on a comparison carried out by Bitco on the possible risks and benefits of the two alternatives, and the promising deliverables that each had, the company chose to go to the global software market to select a world-class package that best suited its current needs, and would serve future visions and trends. Bitco suggested that the company needed an enterprise-wide information system (EIS), which would fit the needs of the company, and would gain value from the reengineering effort. It also developed a high-level architecture of how such a system would be organised across the Manco Group's major business units. The aim of this architecture was to help the Manco Group evolve from a separated set of business units into a single integrated environment which used common business processes. It also aimed to simplify and improve access to information across various departments, providing a business-wide, seamless, and real-time access to information.

<b><i>Network</i></b>	<ul style="list-style-type: none"> <li>- Multiple brands of network components in use.</li> <li>- Selection process not formalised.</li> <li>- Sizing and benchmarking never performed.</li> <li>- Preventative maintenance not exercised.</li> </ul>
<b><i>Organisation</i></b>	<ul style="list-style-type: none"> <li>- Systems department skills not aligned with current technology direction.</li> <li>- Limited specialised training in key technology areas.</li> <li>- Limited training on functionality and industry best practices.</li> </ul>
<b><i>Platforms</i></b>	<ul style="list-style-type: none"> <li>- Several platforms of servers, PCs and operating systems.</li> </ul>
<b><i>Applications &amp; Data</i></b>	<ul style="list-style-type: none"> <li>- Lack of flexibility in current applications.</li> <li>- Lack of support to some required business functionalities.</li> <li>- Lack of paramaterisation, standardisation, and documentation.</li> <li>- Servers' selection not based on data storage requirement analysis.</li> <li>- Limited integration of applications and systems.</li> </ul>

Table 1: Key findings of current status assessment exercise

#### **4. Planning for Change**

The Manco Group realised the need to get the IS and business functions ready for the changes taking place in the business environment. Therefore, it launched the Manco Operations Reengineering (MORE) project to rethink the way it conducted business, and to define the IT, structure, management systems, people skills, and culture necessary to turn this new thinking into a successful reality.

To pilot the reengineering efforts and minimise the associated risks, the Manco Group decided to narrow the scope of the MORE project to cover only its operations at Manco2. Therefore, it subscribed to a high-level business model for Manco2, when an overall IT strategy had been recommended for the entire Manco Group. The business model was considered a tool by which Manco2 could describe how it wished to conduct its business, and identify the interfaces between various business entities' internal processes, its customers, and suppliers. The Manco Group IT strategies (see Table 2) were recommended based on the current status assessment of the existing systems, applications, and data structures, along with the analysis of the business model developed by the BPR team.

The MORE project was sponsored by the President, and directed by an Executive Steering Committee, represented by managers from several departments. The project teams included insiders and outsiders, from Bitco. A project manager headed four redesign teams for four major processes, namely sales and distribution (S&D), material management (MM), finance (FI), and production and planning (PP). Each of these teams consisted of between 15 to 20 people, representing key end-users from various business areas, and one or two people from Bitco. However, the initial agreement arrived at with the consultant was to take a responsibility for the whole change efforts.

<i>Dimension</i>	<i>Strategy</i>
<i>Application Software Strategy</i>	Implement Packaged Software Solution.
<i>Technology Strategy</i>	Use open system, application software-driven, and Unix-based.
<i>Data Strategy</i>	<ul style="list-style-type: none"> <li>• Continue with use of Oracle DBMS,</li> <li>• Capture and store data at source, and</li> <li>• Integrate shared data.</li> </ul>
<i>Group Strategy</i>	Use enterprise system.

Table 2: Overall IT strategies for Manco Group

The MORE project activities were planned in three major phases. *Phase 1* involved delivering two high level strategies for both future business operations and their supporting IT infrastructure. The scope of the operations strategy was the Manco2 division. However, in developing the business model, processes within Manco Group that provided resources to Manco2, like Finance, Human Resources, Engineering and Marketing, were also considered. Operations strategy was concerned with defining a business model, detailing work flows and controls for critical processes, identifying processes for detailed redesign, and identifying where short-term opportunities could be realised. IT strategy, on the other hand, aimed to identify technology requirements and information needs for key functional areas, detailed analysis of current systems, opportunities for improvement, key issues, and recommendations.

*Phase 2* aimed at delivering detailed plans for both BPR in Manco2 and the new IT infrastructure. The detailed BPR plans were concerned with describing work flows for every process at an atomic level, identifying all inputs and outputs, identifying decision-making points in each process, describing benefits resulting from redesigned processes, defining reporting requirements for processes, agreeing and finalising process measures, agreeing and finalising how processes were to be performed, identifying organisation structure and owners of the processes, and identifying short-term improvements. The detailed IT infrastructure plans were concerned with identifying potential systems projects, outlining technology organisation capable of supporting Manco, detailing data and application architecture, and designing an information action plan outlining projects budgets and time-scales to realise IT strategy.

*Phase 3* was planned to cover several aspects of implementation, including developing and implementing a new IT infrastructure that supported the planned business model, training end-users on the new systems and operations, and developing full documentation of the new organisation and flow of work.

## 5. Change In Action

When Bitco was first hired in March 1994, they only committed to Phases 1 and 2. Phase 3 was kept open to be considered later. Bitco subsequently proposed that Phases 2 and 3 should be combined to make the BPR efforts more efficient. After Phase 1 was completed, and a

high level strategy developed (including the Manco2 business model and IT strategies), the BPR team felt that using a tool to begin mapping the business processes would save time and make possible early adjustments based on the way the package proceeded. From their experience with two previous projects, the company had learnt the lesson that although a full documented plan was developed, the projects failed because there was no system that enforced their implementation. Thus, it decided to cease scheduled efforts, and to select an EIS software package which would satisfy the needs identified early on by the current assessment exercise, and one which would align with the developed strategies.

As a result of this decision, a delay occurred in selecting the package while the company waited for Bitco to present their findings on the available packages in the market. Bitco had undertaken a three-phase software selection exercise to identify the application package which best met the business requirements. Of more than thirty packages initially identified (e.g., Oracle Financials, SAP R/3, Triton (BAAN) and EMIS), only SAP R/3 and Triton (BAAN) were found to be the ones most qualified to fit the business requirements of Manco Group. Therefore, the vendors of the two packages were asked to present an initial high-level overview of their software to the Manco Group management. Two further detailed functional demonstrations were given by each of the vendors to key Manco Group functional users from the following areas:

- |              |                    |              |              |
|--------------|--------------------|--------------|--------------|
| • Manco1     | • Manco2           | • Manco3     | • Manco4     |
| - Inventory  | - Sales            | - Sales      | - Production |
| - Purchasing | - Customer Service | - Production |              |
|              | - Production       |              |              |
|              | - Planning         |              |              |
|              | - Technical        |              |              |

The results of the final evaluation revealed that, strategically, SAP R/3 was found to be more likely to support Manco's medium and longer-term requirements. It was also anticipated that SAP's size and market positioning would ensure that the R/3 software package would stay at the leading edge of incorporating world class business process functionality and future technologies. For this reason, the Manco Group recommended SAP R/3 as the platform for their EIS of the future.

The company resumed its efforts in February 1995, and continued until the early months of 1996. The initial focus of the efforts was on the logistic cycle (complete auto-processing cycle). The logistic cycle focused on encompassing all elements from the enquiry through to the auto-processing and high-level manufacture, including the material management involvement, as well as the finance aspects. In short, BPR efforts focused initially on four core processes that were supported by SAP R/3, namely S&D, MM, FI and PP.

Based on Bitco's scope, BPR implementation with SAP was planned to take 18 months, beginning in April 1995 and ending in October 1996. However, Bitco's involvement ended in January 1996, when just the FI and MM modules of SAP had been implemented, with completion percentages of 90% and 80%, respectively. Since then, both these modules have been subjected to continuous improvement efforts.

In early-1998, the Manco Group began implementing the S&D module using the on-line support services (OSS) linked directly to the SAP company in Germany. At the same time, the legacy system ran in parallel, due to unresolvable problems in sending out invoices to

customers. Currently, more than 50% of the S&D module has been implemented, and once completed, it will be handed over to the end-users. Recently, the Manco Group has begun implementing the PP module, and part of it is currently being tested. The company plans to continue implementing the remaining group of applications, and switching-off the old legacy systems.

Configuration and customisation of the SAP modules were undertaken by the IT department. Configuration was mainly focused on process mapping, and setting-up supporting tables. Migration of legacy systems was done automatically, since SAP had interfacing facilities which recognise databases created with Oracle. This process was beneficial, in the sense that it offered an opportunity for data cleaning by eliminating unused and repetitive data from the system.

As SAP R/3 relies on three types of servers, namely application, database, and presentation, the Manco Group designed its SAP architecture as a central system with decentralised presentation. In doing so, the application and the database were used simultaneously on the same server, while the presentation was separate. Future plans, however, involve segregating the application and database servers to increase performance.

The Manco Group recognised the crucial role of adequate training on SAP R/3, and therefore established a training lab, and set up a training programme. The trainees were key business people who understood their business requirements, and were supposed to use the system in their functions. A transitional training approach was adopted, where a trainee trained others.

## **6. Evaluating Change Efforts**

At Manco, few people considered the change efforts to be successful. Among these are the day-to-day managers who worked on the MORE project, and suggested that, with the aid of SAP R/3, they were able to change some outdated functional operations in four areas to modern processes, notwithstanding the fact that the results did not fully satisfy the expectations. However, other people, including the President himself, regarded the BPR efforts as a failure case because of budget excess, long delays, and lower benefits than previously expected. Overall, the Manco BPR efforts can only be regarded as a failure since the efforts could not bring about dramatic improvement and fundamental changes in the Manco Group business process, despite the high investment amounting to \$2.8 million. The modest increase in efficiency attained in some Manco processes, however, was not likely to have a significant effect on overall costs. The cost-value of the BPR efforts was discouraging, because the resulting return-on-investment (ROI) was negative.

## **7. Roots of Failure: Contextual Analysis**

An analysis of the case indicates that it was not so long after the Manco Group had commenced its BPR efforts that failure began to take root. There were several main reasons for the failure of the MORE project. Each of these reasons is discussed next.

### ***Increased Anxiety in Early Days of BPR Efforts***

People resisting change usually use the argument of possible substantial reductions of staff to support their view. It is essential, therefore, that the benefits of any reduction in employment are presented in a convincing framework, leaving no margin of doubts, and taking into account the contextual climate of change.

In the case of the MORE project, a list of savings was developed to justify change and convince top management of the need to reengineer. This, nonetheless, led management to

look at those savings before implementation took place to take the decision to make personnel redundancies. The Manco management failed to give sufficient credence to its employees' distress that was generated by massive change, and that time, it inadvertently failed to take actions which could have eased the sufferings for the Manco Group in the BPR efforts. The BPR project manager offered the following explanation:

*“Changes in the market situation were so drastic and so massive that they even had to resort to other measures which did not, in fact, complement the efforts and caused BPR failure by, for example, reducing manpower and reducing salaries. Therefore, interest in the BPR project began to wane, it began to lose resources and people became nervous because they thought their jobs were on the line and they could be fired at any time.”*

Although SAP implementation inevitably involves some annoyance, there were steps which could have been taken to manage change hurdles. For example, Amoco (Jesitus, 1997; *A Massive Lube Job*, 1997), a leading US oil company, developed a series of “job impact analysis” documents which were reviewed by the implementation teams and then by middle managers to ‘force’ them to become involved, and thus minimised their resistance.

### ***Creeping Shift in Focus***

The case description demonstrates the MORE project's shift in focus from BPR to functional optimisation efforts. The strong resistance engendered by the manpower reductions resulted in BPR-related change principles being compromised. In fact, the MORE project management got carried away by the immediate organisational problems and the daily business demands, and as a result, concentrated on less important optimisation and automation aims. This approach can by no means fall under Hammer and Champy's (1993, p.32) definition of BPR.

Based on a global survey of SAP R/3 implementation in 186 companies, Cooke & Peterson (1998) identify several strategic techniques that help avoid scope creep, and keep implementation efforts on track. The following are some of those techniques:

- Managing against milestones that are well-defined, accepted, and committed to by all the people concerned;
- Making rapid and empowered decisions at the proper levels, and by the most appropriate people; and
- Using standardisation to focus project tasks on developing the appropriate business processes, and software modules that together facilitate reconciling data inconsistencies within the whole system.

### ***Underestimating Potential of Communication***

Organisations often underestimate the level of communication that is necessary to implement BPR efforts (Al-Mashari and Zairi, 1999b). The Manco Group was no exception. There was no formal communication strategy that identified effective mechanisms to ensure cascading of change rationales and plans to everyone affected by the efforts. Although considered by the MORE project management to be the most difficult part of BPR, communication to, and involvement of, people was simply and solely approached through newsletters and ad hoc social events. However, the MORE project management believed that more communication should have taken place, but the reason for not doing so was a lack of support from the human resources (HR) department. The MORE project manager explained:

*“There was a lack of communication planning. The HR was supposed to head a change management team to support the BPR efforts, but that unfortunately was not filtered down.”*

The importance of communication stems from the fact that it could build the competence of the whole organisation in BPR efforts. Communication is also crucial to gaining everyone’s commitment, support and response. It could assist people accept the unknown, and help to get rid of needless anxiety. Thus, management should recognise that continuous communication is absolutely necessary, and they should keep up the momentum of their initial communications strategy.

In their SAP R/3 implementation initiatives, both GTE (Caldwell, 1998), a telephone operation group, and Owens Corning (Antia, 1996; Bancroft *et al.*, 1998; Romei, 1996) established extensive internal communications channels, including focus groups, newsletters, e-mail and web-based archives, to help keep employees informed about new developments, and answer questions about the SAP implementation. Lucent (Francesconi, 1998) also uses collection tools such as surveys, communication sessions, and conferences, to keep the doors of communication open for everyone.

#### ***Neglecting Progress and Performance Measurement***

Although many organisations embarking on SAP implementation initiatives spend time and money on developing measures to estimate the anticipated impact of their BPR efforts, these measures sometimes fall by the wayside as efforts develop further. This is exactly what happened in the case of the Manco Group, as described by the MORE project manager:

*“The progress of the MORE project and its resulting benefits were not measured. Although some parameters were developed, such as turnover, manpower, collection (cost reduction), inventory, cycle time and benchmarking, they were not followed up.”*

Having a comprehensive measurement system provides a feedback mechanism to track implementation efforts, identify gaps and deficiencies in performance, and recommend the necessary actions to fine-tune the situation in hand (Al-Mashari and Zairi, 1999b). A performance measurement system is also needed to monitor process performance against a set of predefined indicators that ensure that the SAP implementation effort is well on target to achieve the desired business-centred outcomes. Kodak (Stevens, 1997), for instance, uses a well-disciplined “phases-and-gates” approach that moves projects through a series of steps of assessment and planning, design and prototyping, and delivery and absorption. This approach enforces a review of the efforts at specific checkpoints, with very specified deliverable expectations and “statusing”, in order to ensure that the efforts fulfil commitment levels within the expected time and budget.

#### ***Ineffective Management of Consultant***

While it is widely believed that help from an external consultant is important to inject the concerned organisation with new skills and expertise, the Manco Group experience contrasted with this belief, and revealed several problems. From the Manco Group management’s point of view, it was strongly concluded that the consulting firm was not competent enough in carrying out its job. They felt that it used the MORE project as an ‘experimental field’, where the project underwent several alterations to major plans during

the efforts. This may be true, as the Manco Group is certainly among the early implementers of SAP R/3, and global experience at that time was minimal. Rather, it was almost technically focused, and the awareness of the organisational change aspects, though often claimed, was not adequately demonstrated practically (Bancroft *et al.*, 1998). However, the Manco Group also contributed to this problem, as it marginalised its participation in the project, and retained a minor managerial responsibility for its employees in the efforts. Consequently, this led the company into a floating situation, where decisions were hard to make, especially in the absence of progress and performance measures. This, in turn, allowed the consultant staff to deliberately direct the project, and make decisions that, transparently and negatively, influenced other major roles in the company. This clearly demonstrates how BPR's potential can be compromised in early stages, when ownership of the effort lies in the wrong hands. Manco Group engaged consultants to assume responsibility for the entire efforts, and to present their findings and proposals to management for approval. In so doing, it left them in full control of a process which could radically affect the make-up of the business.

However, best practice organisations, like Kodak and Owens Corning, have all taken a clear approach to emphasising their ownership of their SAP projects, and to ensuring an effective transfer of knowledge and expertise. At Owens Corning (Antia, 1996; Bancroft *et al.*, 1998; Romei, 1996), the consultants were used for two specific tasks: (1) facilitating early process design, and (2) training on technical aspects, especially in the SAP components and the client/server. To maximise the technical expertise of the consultants, and build new capabilities internally, Owens Corning adopted the concept of knowledge transfer, by which transference of all necessary skills to Owens Corning's employees at the end of the project was ensured.

### ***Separating IT from Business Affairs – Technical Mind-set***

It is obvious from the narrative that the MORE project management had adopted a technical perspective, viewing IT as a force affecting, and leading to, a certain organisational form. This caused a huge negative impact on SAP implementation and hindered it in many respects. Also, with regard to measuring the effectiveness of the new IT, i.e. SAP R/3, on the complete business operation, the IT manager explained:

*“The IT department began monitoring those services it provided to end-users and those which could be related to legacy systems and which related to office automation. A help desk was established for monitoring purposes, to provide some statistics on performance. However, from the BPR point of view, there were no such efforts, because the issue was not thought to be a corporate matter with a strategic concern.”*

Although BPR plans included this component, techniques and tools that help operationalise strategic statements were not developed. Altogether, these problems resulted in a lack of alignment between business strategy and IT strategy. This might be put down to a lack of developing, and thereby cascading, a solid and well-defined business case for the entire change initiative. The business case is beneficial in that it ensures that a project is firmly tied to business-specific results (Cooke & Peterson, 1998). Developing a business case should always be a continuous task that begins with a conceptual vision and evolves towards a more detailed operational measure, until the SAP project is completely rolled out (Stevens, 1998). To justify launching a project, a business case should initially target areas of an order-of-magnitude and immediate direct impact which, in turn, could help make a commitment to achieving rapid return-on-investment (ROI) (Stevens, 1998; *Just in case*, 1998).

Experiences reported by best practice companies show how the business case for SAP implementation can be developed to address both the organisational vision and the operational measurements. To secure a leading position in the global marketplace, and to achieve its vision for the year 2000 and beyond, Owens Corning, a \$3 billion world-leader in building material systems and advanced composite materials, launched a two-year initiative, Advantage 2000, to reengineer its global operations and implement SAP R/3 systems (Bancroft *et al.*, 1998; Stevens, 1998; Romei, 1996; Anita, 1996). Among the aggressive goals the company has defined are the following: the target of \$5 billion in sales by the year 2000, solid brand recognition, continued productivity improvement, and expansion into new products, applications and markets. Other goals are a 6% productivity improvement per year, and a 1% improvement in the cost of raw material acquisition. Advantage 2000 includes redefining Owens Corning's business processes to be more standardised and global, with an emphasis on speed, simplicity, responsiveness to customers, empowerment of employees, teamworking, and the creation of a paper-less work environment.

### ***Lack of Readiness in IT Function***

As explained by the IT manager, the IT function was not sufficiently equipped to carry out the BPR efforts in conjunction with SAP implementation. Scarcity of experienced staff, lack of training and education, and increasing overload have all contributed to the failure of the efforts. SAP R/3 is a complex application, which places on IT staff the responsibility of supporting end-users on a daily basis. This requirement was underestimated at the beginning, and end-users resisted the new system because they were not given enough skills to work with it.

Besides empowering the IT function with the necessary training and resources, there should also be a shift towards defining new IT roles and responsibilities, adopting new approaches to implementing IS, and building distinct IT competencies. These are needed to meet the IT management challenges that SAP brings about, such as: (1) reduced need for development programmers, (2) reliance on complex architectures, (3) higher user involvement, and (4) user ownership of systems and data (Bancroft *et al.*, 1998).

As a result of SAP implementation, NEC Technologies re-titled the old MIS organisation 'Strategic Systems', and gave it a new mission: to bring innovation, transformation, value, vision, and alignment of new IT enablers to the business. This new organisation recognises that it needs to be close to the business (Bancroft *et al.*, 1998).

### ***Miscellaneous Problems***

Apart from the aforementioned reasons for failure, there are also other problems that contributed to the failure of the MORE project. These were pinpointed by interviewees, and can be summarised as follows:

- Underestimating the human resources elements in change,
- Low level of commitment from the redesign teams' members,
- Insufficient resources, especially manpower and finance,
- Lack of cultural preparation for change, and
- Inability to anticipate and manage risks adequately.

## **8. Implications for Future**

It is obvious that the BPR efforts have left a negative impact on the Manco Group. Employees have a negative perception of BPR, and an increased sensitivity towards any change effort in the future. These outcomes will surely also be reflected in the organisational memory of the Manco Group, and become part of its organisational culture and beliefs. A team member of the MORE project, for instance, said that:

*“We no longer entirely believe that it is possible to implement these change approaches. They were developed in and for a different context and a different culture and, therefore, do not apply to our business.”*

This failure also cost a great deal of time and money, and led to a reduced focus on the market. The trustworthiness of some senior managers was also a casualty of this failure. When the Manco Group’s management recognised that their BPR effort had ended in failure, it was decided to start the whole effort all over again, and to face the tough challenges created by this experience. Their current vision is to institutionalise a process-orientation thinking and structure throughout the Group business units, by making more effective use of SAP R/3 applications. In order to do this, a new project manager has been appointed to review the current situation, and develop a plan to focus efforts onto meeting the increasingly pressing needs of the company, and promoting its position in the market. However, the company will have a difficult task ahead in convincing employees that this time it can be successful, and in regaining their trust. They will have to confront deeply-held values and beliefs, and develop a committed and organised approach, with a credible management to change them. In order to succeed, Manco will have to learn from best practice companies. They will have to identify, amongst other valuable lessons, how the successful companies avoided implementation pitfalls.

## **8. Conclusion**

The current information poverty in many business organisations can essentially be attributed to one of two major reasons:

- the inability to make huge investments in the increasingly costly emerging hardware and software systems, or
- the inability to position these technologies effectively, if in hand, to improve the business performance.

In the case of organisations that implement SAP R/3 as an information equality technology, establishing this equality at both information and business process levels, within and beyond organisational boundaries, is highly dependent on the way in which the core business processes have been designed, as well as the extent to which they have been integrated with other business components. Therefore, knowledge of how SAP R/3 has been implemented and positioned in an organisation will enable determination of the extent to which information resources are shared adequately. Consequently, the more success in deploying this technology, the higher the degree of integrity in business processes and information technology infrastructure.

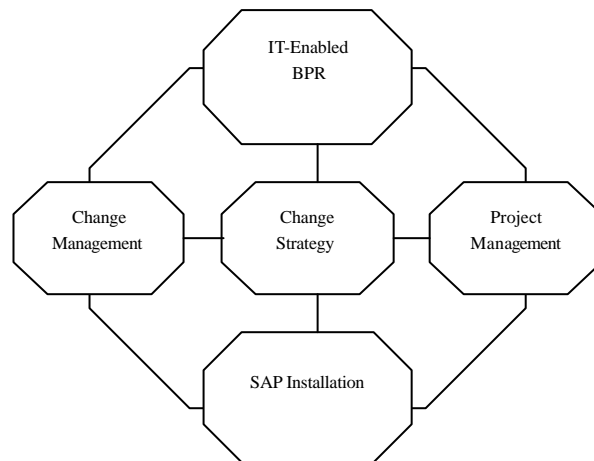


Figure 2: Core competencies for effective SAP R/3 implementation

Overall, reported experiences in SAP implementation have shown that effective implementation requires establishing the following five core competencies (Figure 2):

- *Change strategy development and deployment* – to ensure alignment with overall corporate strategy, and determine organisational principles and approach of implementation.
- *Enterprise-wide project management* – to define various roles and responsibilities of both internal and external entities in the implementation efforts, and determine forms of co-ordination, and co-operation among them.
- *Change management techniques and tools* – to facilitate the insertion of newly-implemented systems, processes and structure into the working practice, and deal with possible resistance.
- *BPR integration with IT* – to redesign business procedures to accommodate SAP software modules within the entire business operation.
- *Strategical, architectural and technical aspects of SAP installation* – to manage all SAP installation-related activities, such as sourcing SAP applications, legacy systems migration, customisation and configuration.

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