SAP and business process re-engineering

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Abstract To remain competitive many businesses in the 1990s have undertaken business process re-engineering (BPR) projects re-organizing and re-structuring their business operations. At the same time the need for an IT business solution has enabled integrated business packages such as SAP’s R/2 and R/3 to quietly dominate the IT systems industry. Although the successes and benefits of SAP have been widely published, there is little literature on the problems associated with embracing such an integrated and unique system. The paper results from a case study of the evaluation and implementation of SAP by a very large US multinational corporation in its European, Australian and New Zealand businesses. The different approaches to the installation of an integrated core system and BPR are explored. Problems and lessons that can be learnt from the company’s experiences are also highlighted in this paper.

Introduction
This paper cover a period from the late 1980s to the late 1990s, when systems, applications and products in data processing (SAP)[1] became widely used outside Germany to replace core systems.

SAP, originally developed and marketed in Germany, is an integrated software package providing core business applications. In the 1990s SAP software became better known outside Germany and captured a large share of the integrated package market in medium and large companies throughout the world. With extensive functionality and a high level of integration the software covers the full range of business requirements, including financial accounting and control, sales and distribution, materials management, production planning and human resources management.

During the 1990s an increasingly competitive world was also driving the use of BPR (Hammer and Champy, 1993) and business restructuring to improve profitability and return on capital employed. Substantial, and in some cases traumatic, restructuring and downsizing took place in many organizations to reduce costs and management layers. The challenge was to structure a leaner, more customer focused and flexible organization to meet the competitive challenges in the global economy.

In this case study SAP software was used to drive the restructuring of a very large business in 16 countries in Europe. The individual businesses in the 16 countries were combined into a single pan-European business, headquartered in the UK, with a SAP core system and a standard reporting process serving a centralized management team.

In the same timeframe SAP was installed as the common core system in the Australian and New Zealand businesses with no immediate restructuring
objectives. Low profitability in Australia was addressed by a separate BPR venture, which was not related to the implementation of the SAP software. Significant restructuring, which overlapped the introduction of the software, took place in the Australian business. However, following the implementation of SAP further BPR was facilitated by the integration present in the software.

The paper first describes the multinational organization structure and culture of the company to indicate the background and driving forces behind the evaluation and use of SAP software, first in Europe and then in Australia and New Zealand. The business drives for the use of SAP in the European business context are then briefly outlined.

The Australian evaluation of SAP is described in some detail including the findings of a six-month business and IT review of SAP in the Australian and New Zealand business environment. The decision-making process, which led to the installation of SAP as the software for the core applications in the two businesses, completes the evaluation. The problems that arose during the implementation of SAP are outlined in the following sections.

A discussion of the interaction between BPR and an integrated software package, as demonstrated by the experience in the European and Australian businesses, is followed by the case study conclusions.

**Company structure and culture**

The parent corporation is a very large multinational headquartered in the USA and operating in more than 100 countries throughout the world. Organizationally it was divided into four or five line of business divisions each of which was big enough to be a large multinational corporation in its own right. A separate (international) division was responsible for the business conducted outside the USA.

This division was then split into regional management companies that supervised the businesses in the different countries around the world. Each country-based business had a full range of staff support services including its own systems developed in-house or purchased locally to support the business needs in that country.

The division maintained standardization and commonality by requiring each business to submit major new IT proposals or equipment acquisitions for review and concurrence. Some IT products were specified as standard products and departure from these standards also required review at division level.

Despite these quite comprehensive guidelines and review processes IT departments in each country developed their own applications with very little commonality or sharing of expertise between countries. From a division (top down) viewpoint there were many disparate systems, little standardization outside the hardware, and a great deal of duplication and “reinventing the wheel” syndrome.

Over the years various attempts had been made to standardize on package software from mainly US software houses but for various reasons these attempts were not successful. In some cases the software did not prove robust
enough, served only a section of the core applications (e.g. financial systems) or implied a technology conflict with the major technologies in use. Co-ordination of business needs between countries to develop standard applications proved difficult to achieve in a cost-effective way despite a number of well-resourced attempts. So the local businesses continued to separately develop or purchase their software.

SAP introduction in Europe
SAP had come to notice in Europe via the business in The Netherlands, which was looking to replace its obsolete systems with a packaged solution. In their review of packages SAP was evaluated and became the preferred solution.

At the same time, and coincidentally, regional management was determined to increase profit and return on capital employed in Europe, which had been performing poorly as a region for a number of years. In comparing the structure of the business in Europe to the USA, the European country-based business structure was seen to be an artificial restriction on the ability to introduce efficiencies and economies of scale. Each business in Europe had a full corporate structure and operated mainly within a particular country. Of course the language and cultural differences of the European countries were major points of departure from the USA. However, the language of business was English and all senior managers were fluent in English.

In this environment European line management saw the potential standardization and efficiency benefits an integrated business package could provide. A plan was formulated to use the implementation of SAP software to drive business re-engineering in Europe. SAP would be used to standardize the core systems, business practices and management reporting. The European business would be run as one unit, ignoring national borders. SAP was to be implemented progressively in a relatively short time frame, country by country, starting with the smaller businesses before the larger businesses in France, Italy and the UK were tackled.

SAP introduction to Australia and New Zealand
In Australia a proposal, for the in-house development of a major core customer application to replace a 25-year-old batch system, was being reviewed with the division IT department. Division IT recommended SAP software to Australian management as potentially a better solution than in-house development. Building on the plans in Europe the concept of a worldwide implementation of SAP as a common system was gradually formulated and promoted to the businesses in Asia, Australia and New Zealand.

The New Zealand business wanted to replace obsolete financial and purchasing systems, while the Australian business had modern online financial systems, but was also interested in a purchasing application. The New Zealand business mainframe processing was already serviced in Melbourne by the Australian business and attempts had previously been made to co-ordinate IT planning between the two countries.
Against this local and international business background a business and IT strategy study was undertaken in Australia to review SAP in the Australasian business environment.

**Strategy for evaluation of IT systems**
According to Porter and Miller’s value chain model (Porter and Miller, 1985), the internal operations in a company can be analysed to increase its efficiency, effectiveness and competitiveness. It was later extended to explain how IT could provide support and competitive advantage. By superimposing IT systems on the underlying activities in the value chain IT can be shown to support the company and its overall business strategies. A number of IT-related issues have arisen in the last decade or so.

- Rules of competition have changed.
- Companies that used IT have outperformed their competitors.
- New companies have been created due to IT.

Triggered by this emerging role of IT and the problems outlined in the previous sections the company described in this paper performed an internal review of its IT operations.

**Evaluation strategy in Australia and New Zealand**
While the two businesses in Australia and New Zealand were immediately interested in different modules of SAP, the review team recognized that a decision to use SAP for the core customer application in Australia was a strategic step.

A six-month evaluation process was undertaken consisting of three major parts:

1. A detailed evaluation of SAP’s RV module to determine its suitability to implement the required core customer functions.
2. A technical evaluation of the software itself.
3. High-level evaluations by user personnel of the various SAP modules to determine their ability to meet the purchasing, accounts payable, accounts receivable, inventory accounting, order taking, scheduling and distribution business requirements.

**Technical findings**
SAP software was considered to be technically excellent with design concepts well ahead of competing vendors. At the same time the software was found to be very complex, requiring both expert SAP assistance for problem resolution and extensive training of in-house IT personnel.

Unlike other software packages that had previously been routinely installed into the existing IT environment, implementation of SAP was akin to changing the IT environment.
**Functional findings**

There were reservations associated with the RV module due to SAP’s real time philosophy and the need of the Australian business to process a significant proportion of sales documentation in batch mode. Also some business requirements peculiar to the Australian marketing environment were not available in SAP. With the important exception of inventory management all of the high-level individual component evaluations indicated that SAP could satisfactorily support development of the required applications.

**SAP support**

Based on the positive and negative experiences of SAP support during the evaluation process, the study team believed that the SAP resources in Australia would need to be supplemented by flying specific experts to Melbourne. The team recommended that specific assurances be obtained from SAP headquarters on how and when support would be provided before embarking on a SAP strategy.

**Risks**

Many risks were identified associated with an immediate commitment to SAP. Key industry specific enhancements were not yet defined, much less installed in the software. There was a lack of information about running costs and service levels in a total SAP environment and communication difficulties with SAP headquarters in Germany. Software support people in Australia were inexperienced and little SAP software delivery experience was available, particularly for an undertaking of the magnitude of replacing all core applications in Australia and New Zealand.

**Decision making process in Australia and New Zealand**

The leader of the study team, supported by Australian IT management, recommended that a comprehensive commitment to SAP be deferred until internal and external expertise was more readily available in Australia. She also recommended that the purchasing module be implemented immediately to gain first-hand experience.

Management of the Australian and New Zealand businesses, supported by Division IT, wanted to make a more immediate and substantial commitment to SAP to avoid continuing with in-house development of core applications which would later be replaced by SAP software.

Local management recognized the risks inherent in making such a commitment to a new technology at a very early stage of SAP experience in Australia. However, Division IT encouraged the Australasian businesses to make the “SAP decision” as part of a common systems strategy in Europe, Australasia and Asia. It was assumed that, if a commitment to SAP was made on a worldwide basis and the necessary framework to properly manage the conversion to SAP established, the risks would be minimized.
The level of management involvement in the decision-making process had the positive impact of focusing the organization at senior levels, locally and in the parent corporation, on the commitment required to implement a common online integrated system. This focus led to the dedication of the necessary resources (internal and external) and the organizational determination to see through a long and costly undertaking.

**Implementation in Australia and New Zealand**

A venture team, comprising business and IT experts from Australia and New Zealand, was put together. The manager of the venture team reported directly to the managing director in Australia and a steering committee of senior Australian and New Zealand executives, including both managing directors, was formed to manage the venture.

Separate teams were used to develop each application (e.g. general ledger/expense). Each development team was a complete unit, comprising business experts and IT staff, in the ratio of about 50/50. Team leaders of the application development teams were business people and project managers, again business people, supervised three to five teams. A technical team was responsible for interface development and integration. Business and IT team members attended the same application training courses. The business people developed an excellent understanding of the technical issues and the IT people came to understand the business drives and processes.

The multi-million dollar project took about seven years to complete and the venture team peaked at 130 people. People costs accounted for 70 percent to 80 percent of project costs with about 15 percent hardware related and only 5 percent for software.

**Phased approach**

As the concept of converting all the core applications to SAP at one time was considered to involve unacceptably high risks, the implementation was carried out in two major phases. However, phased implementation of SAP gave rise to other problems and costs. Two copies of each commonly-used database had to be maintained and synchronized until full conversion to SAP was achieved. Interfaces to existing systems had to be built and supported until the old applications were replaced.

The phase boundaries were driven by the immediate business needs of the Australian and New Zealand businesses, which did not align with the natural boundaries within SAP. Use of the natural boundaries to define the phases would have meant a quicker implementation and lower costs.

**Software stability**

The software required to meet the business needs was not available when the project started. The industry specific enhancements took five years to develop
and implement, which caused delays and increased costs. Bugs in new software releases during the project led to problems in the early months of production and poor perceptions of the SAP software.

**Organization changes**
In phase one the implementation of a major organizational restructure in Australia caused the following problems:

- About 60 key managers/staff were taken out of the workforce to work on the restructure during a critical period when the project development teams needed to consult them. Their absence limited the expertise and knowledge input to the project.
- Development took place in an uncertain environment.
- People were reluctant to attend training as the uncertainty created by the imminent staff reductions took the focus off the project.
- The major movement of staff arising from the restructure two months after implementation of phase one meant staff were inexperienced in their new roles and lacked the relevant SAP training to do their jobs effectively.
- Ownership of the SAP system was not taken by users who had not been previously directly involved in its design and development. In some cases new managers did not accept their predecessors’ decisions and required changes to the system.

**Management commitment**
Business units varied in their real commitment to the project particularly when the associated process changes met with resistance from users of the new system. Those groups that participated fully in the development and prepared well produced the strongest results. Other groups needed to address cultural and human issues after implementation to benefit from the new system. New Zealand management deferred their participation in phase 2, preferring to remain with their in-house system. Phase 2 in New Zealand was delayed and implemented separately later.

**Training**
The training of users for phase 1 was an enormous and complex task. A total of 1,525 people in two countries, 1,500 kilometres apart, had to be trained in three months; 20,000 attendances were required at 1,600 training sessions in 47 classrooms at 12 training locations. The magnitude of the training dictated the involvement of professional trainers to develop the training material and deliver the sessions. This outsourcing led to an absence of job focus in the training content and was a major user criticism.

Based on the lessons learnt in phase one a different (cascading) approach was taken in phase 2. The development teams imparted detailed application
knowledge to user specialists (business people with a broad knowledge of business practice and the application of that practice in the new system). The user specialists in turn imparted a subset of that knowledge to local user experts (people based in specific work units who would use the system regularly and develop their knowledge and expertise beyond implementation). The local user experts conducted training workshops and provided local support to regular and casual users in their work groups.

Discussion
The installation of an integrated SAP system is a strategic decision with substantial cost and disruption to the business implications. The cost of the projects in the case study far exceeded all expectations and took much longer to complete than originally envisaged. The training effort was substantial and difficult to deliver effectively in a timely manner.

Experience from the case study indicates that if a business process does not fit well with standard SAP then the process should be reviewed critically and some hard decisions made before doing something non-standard. The implementation of SAP brings with it the immediate opportunity for BPR. However, it involves job restructuring and line staff, in particular, can be resistant to the changes, e.g. moving data entry closer to the data source. Other re-engineering benefits take longer to achieve but integrated software enables further process improvements not necessarily envisaged in the original project plan.

It is clear the project should be completed in the shortest feasible time frame, using stable software to avoid concurrent organizational change and flagging management commitment as costs rise and problems develop. The management of change is key and careful planning and execution of employee training and buy-in is required to achieve the benefits required to support the significant investment.

Conclusion
The different approaches to the use of SAP in this paper raise the question of whether IT should be used directly as a business re-engineering tool or the business processes re-engineered before introducing new software. IT and BPR often go hand in hand because the use of new technology makes new working methods possible.

It may be prudent to first address fundamental business and management issues. In many enterprises IT has very little influence on these issues but can be used to support new organization structures and re-engineered processes. BPR is also a quicker process with benefits accruing more rapidly for companies that, due to low profitability, are in immediate need of improvement. The approach to IT investment may take an entirely different course following restructuring and BPR.

If SAP is used as a BPR tool, as it was by European line management in this case study, fundamental business issues may be overlooked. While the
software may contain more advanced business processes than the obsolete and diverse applications it replaces, the opportunity for significant business improvement may not be addressed as the effort to implement the software consumes the organization.

The imposition of the new software accompanied by restructuring and downsizing can also meet with a great deal of resistance from the organization itself. The new system can be seen as an instrument of painful change, impacting the lives of many people including senior managers, rather than an improved way of doing things for the benefit of individuals as well as the organization.

SAP has developed a rapid implementation process that requires acceptance of the predetermined BPR built into that form of the software. This use of SAP has the option of a faster, lower cost project where the software dictates the business practices. These practices, while advanced and possibly an improvement on the processes being replaced, may not be optimal, but are readily available and documented. The opportunity for competitive advantage from business restructuring may be lost if this option is taken.

Alternatively, the organization can look longer term and tailor the SAP software closer to the (re-engineered) business needs and perhaps obtain a competitive advantage from the combination of BPR and then IT investment. However, this option probably means a higher project cost and a slower, more complex implementation.

A decision as strategic as the installation of new core software requires the issue of BPR to be fully explored to determine the preferred way to proceed in the organization's particular circumstances.

Note
1. SAP is a registered trademark of SAP Aktiengesellschaft, Germany.

References