December 1999

SAP R/3 Implementation Issues for Small to Medium Enterprises

Guy Gable
Queensland University of Technology, Australia

Glenn Stewart
Queensland University of Technology, Australia

SAP R/3 Implementation Issues for Small to Medium Enterprises

Guy Gable

(g.gable@qut.edu.au)

Glenn Stewart

(g.stewart@qut.edu.au)

Information Systems Mangement Research Centre, Faculty of Information Technology

Queensland University of Technology, Australia

Abstract

We are undertaking research into "Issues in ERP in Small and Medium Sized Enterprises in Australasia." Main objectives of the research are to better understand issues faced by small- and medium-sized enterprises (SMEs) in adopting ERP; better understand local/regional SME expectations of ERP; promote awareness of developments promoting and facilitating increased uptake of ERP by SMEs; influence curriculum design to produce graduates who are well placed to be closely involved in the uptake and support of ERP in SMEs. This paper reports on the design of this research project.

Background

While SAP's significant efforts have seen the successful adoption of ERP by a majority of very large organisations worldwide, only in the past couple of years has SAP begun to focus on small- and medium-sized enterprises (SMEs). Market developments, technology developments and ERP developments are all encouraging the increased uptake of ERP by organisations with revenues between $50-200 million.

Market characteristics encouraging increased focus on SMEs by ERP vendors include:

- Most LEs have adopted ERP (the segment is largely saturated)
- Electronic commerce benefits from close integration between LE and SME systems
- SMEs grow up to be LEs (and will tend to retain existing systems if they are scalable)
- The vast majority of businesses are SMEs rather than LEs (and account for a majority of economic activity, jobs and assets)
- Integrated packages originally developed for the SME market are becoming increasingly upwardly scalable (to some extent due to technology developments listed following)

At the same time, various technology developments are encouraging the increased uptake of ERP by SMEs:

- The advent of powerful, relatively inexpensive microprocessor-based servers
- The advent of new, scalable, full-function PC and network operating systems (specifically Windows NT)
- The availability of a low-cost database management system for the Windows NT platform, in SQL Server

Major recent SAP initiatives that have made R/3 more accessible to SMEs include:

- Introduction of the ASAP implementation methodology
- The Certified Business Solutions Program
- Shrink wrapped, 'Ready-to-run R/3'
- Industry focused solutions
- R/3PAQ

Prior Research into Small and Medium Enterprises

Though the above listed developments suggest increasing uptake of ERP by SMEs, there is yet a need to better understand the disincentives, many of which continue to exist. It is thus important to consider how SMEs differ from larger organisations and how these differences may influence the ERP implementation issues faced by SMEs.

In [1984] Raymond proposed a conceptual framework, identifying four main dimensions of the specificity of SMEs: (1) organizational, (2) decisional, (3) psycho-sociological, and (4) information systems. The four dimensions, and their related underlying properties, represent unique characteristics of SMEs, that may have significant influence on the ERP implementation lifecycle. Following are discussed these four dimensions and their related properties.

Organizational Specificity: The SME is typically characterized as: having a simple and highly centralized structure [Mintzberg, 1979]; being "resource poor" in human, financial and material terms [Welsh and White, 1981]; and facing greater environmental uncertainty, as they have a lower measure of control over their extra-organizational situation [Miller, 1987]. For example, SMEs have less influence over computer vendors or consultants and thus they may receive a relatively lower level of service [Delone, 1988]. SMEs can also be located in more remote areas, where service delays are longer and external computing resources scarcer.

Decisional Specificity: The strategic decision cycle or time frame of the SMEs is characterized as being: generally short term, with a reactive rather than a pro-active orientation [Mintzberg, 1973]; and less formal, using fewer formal management techniques (e.g. in capital budgeting, project management, inventory control and financial analysis) [d'Amboise and Gasse, 1980]. It is also suggested that the decision-making process of small business managers is more intuitive and judgemental and

less reliant on formal information and decision models [Rice and Hamilton, 1979].

Psycho-Sociological Specificity: Owner-managers of SMEs play a dominant role in terms of strategy, decision-making, and the psychological climate within their organization [Miller, Kets, de Vries and Toulouse, 1982]; they are less prone to sharing information and delegating decision-making [Kets, de Vries, 1977]. There would thus be few individuals other than the CEO who have sufficient authority, responsibility and information access to justify the implementation of ERP. The organization's psychological climate with respect to information systems is determined by the prior experience and training of management and end users [Franz and Killingsworth, 1982]. As managers in SMEs tend to have less computer experience and training [Nickell and Seado, 1986], their expectations tend to be lower and their attitudes more favorable toward their organizational information system. This may make them less critical, but also less willing to critically evaluate benefits.

Information Systems Specificity: Most SME computer applications are transaction processing applications [Raymond, 1985], acquired as pre-programmed software packages. The information systems function in most SMEs is typically: in an early stage of evolution; subordinated to the accounting function; lacking managerial expertise to plan, organize and control the use of information resources of the firm; and possessing of a relatively low level of technical systems development sophistication [Mahmoud and Malhotra, 1986]. Organizational information systems are generally under--utilized by SME managers [Massey, 1986].

Table 1 presents a summary of the four dimensions and their possible effect on the implementation of ERP in SMEs. It can be observed from Table 1 that barring the existence of SME specific solutions (e.g. R/3PAQ), on balance barriers to ERP implementation in SMEs are expected to be greater than in larger organizations. It is highlighted that this discussion and Table 1 are highly tentative and while the four dimensions may ultimately serve as a useful model for differentiating SMEs, the effect of these differences requires extensive validation through the research. While the final design of the study would be developed in collaboration with Sapient College and the Ph.D. candidate, it is expected that a combination of case study and survey research methods would be employed.

Factors	Effect	Characteristic
Structure:	+	top management has broader control
• Simple, centralised	-	less opportunity for specialisation of function
Resources:	-	few resources to allocate to implementation
• "resource poverty"	-	higher risk computerisation solutions chosen (e.g. no backup server)
	-	less opportunity for specialisation of function
Extra-organisational Situation	-	less influence over computer and security vendors and consultants
• uncontrollable	-	More dynamic market and systems needs

Table 1 Organisational Specificity

Factor	Effect	Characterisation
Decision Cycle:	-	more dynamic threats and vulnerabilities
• short-term, reactive		
Decision Process:	-	more likely to err in valuing systems
• intuitive, judgmental	-	more likely to underestimate costs and benefits
• less use of information		
• less use of formal mang. techniques		

Table 2 Decisional Specificity

Factors		
Domination by the CEO:	+	top management has broader control
• less sharing of information	-	less likely to delegate responsibility
• less delegation of decision making	-	less likely to have time for system admin
	-	less likely that anyone else could initiate a change management program
Managerial Ideology:		
• more individualistic	-	less likely to follow 'normative' models of good implementation practice
Psychological Climate:		
• more favourable attitudes	-	less critical
• less expectations of org. computing	-	less inclined to appreciate potential benefits

Table 3 Psycho-sociological Specificity

Factors	Effect	Characteristics
IS Function:	-	fewer controls designed in
• in its earlier stages	-	lesser knowledge of controls & threats
• less managerial expertise, IS experience & training		
IS Sophistication		
• emphasis on transactional & packaged applications	-	greater reliance on external advisors
• less technical expertise	-	less able to implement technical solutions
IS Success:		
• under utilisation of organisational IS	+	the organisation is less reliant on IS
• little impact on decisional & organisational effectiveness		

Table 4 Information Systems Specificity

Major Tasks of the Study

Major tasks of the study include:

- evaluate the effects described in Table 1.
- Conduct detailed case studies of SME R/3 implementations
- Conduct a detailed case study of a vendor's experiences with R/3 implementation in SMEs
- Establish collaborative research links in order to conduct U.S. case studies for comparison
- evaluate strategies of small systems competitors (e.g. Platinum) seeking to clearly itemize differences, strengths, weaknesses.

Key Benefits

Benefits of the proposed study are expected to accrue to several stakeholders, including Sapient College, SAP resellers (e.g. Data#3), and SAP Partners as well as to QUT and its graduates. Key benefits expected to follow from the proposed research include:

- improved understanding of the local SME market
- widespread exposure for SAP's SME-targeted activities in the tertiary educational sector in Australasia, Asia and the SME market
- clear identification of factors important to successful implementation of R/3 in SMEs in the local/regional context
- input to local/regional curriculums using R/3 (where SMEs predominate)
- as a consequence of the preceding, the graduation of students who have the appropriate combination of skills to be immediately productive with ERP in SMEs in the local/regional context

- Positive exposure for SAP and Sapient College around the Australasian and Asia Pacific regions and the world

Progress to date

Two detailed case study protocols have been developed. One addresses the issues in Information Systems Specifity. This study also examines the economic factors effecting the outsourcing of SAP implementation and management. The other study looks at the change management practices necessary to support effective implementations, and addresses the Psychological Specific elements. The remainder of the study is undergoing detailed definition.

Conclusion

There has been relatively little research conducted into the unique problems and issues faced by SMEs when introducing new information technology. In particular there has been little research conducted into the implementaito of SAP R/3 into SMEs. This research program seeks to address these deficiencies. A tentative model describing interacting variables has been proposed. The design of the research testing this model has been presented. This research will use a multiple-method approach, including case studies and quantitative analysis. The results from this study will benefit 1). SME in knowing how to adopt SAP, 2). Resellers trying to service this market, 3).SAPIENT college in developing training courses for this market, and 4).SAP in seeking to effectively implement SAP R/3 in SME.

References

References will be supplied by first Author on request.