Major Issues with Enterprise Systems: A Case Study and Survey of Five Government Agencies

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Abstract

This article reports a case study that examined the introduction of the SAP Financials system in five closely related Queensland Government agencies. Though SAP Financials have been in place in these agencies since late 1998, new issues associated with the ongoing support and evolution of the system continue to arise. A three-round, non-anonymous, Delphi-type survey was designed to understand and explicate major issues in relation to ERP lifecycle support within the five government agencies. Attempts to map issues to several existing, descriptive frameworks did not allow a satisfactory level of discrimination between substantive issues. An open coding approach and synthesis procedures resulted in a master set of 10 major issue categories. This article serves to focus discussion and promote constructive interaction for the purpose of developing an increasingly sophisticated understanding of the nuances of ERP lifecycle implementation, management and support generally, and of implementation within the public sector in particular.

Keywords: Enterprise Resources Planning, Enterprise System, IS Key Issues.
企業資源規劃系統重要議題之研究 – 以五個政府機構為例

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摘要

本篇文章報告了五個相關機構導入企業資源規劃系統 (Enterprise Resource Planning, ERP) 的個案研究。為了詳細地了解這五個政府部門有關 ERP 生命週期之建立、管理與維護所帶來的議題。本文研究進行的策略可以描寫為探索性、敘述性與比較性的個案研究方法。應用非匿名化電子郵件及三組回函 (Delphi-type) 進行調查的研究方法。此方法可以將調查所得的資料製成現存之理架構並無法滿足參與研究者 (特別是參與政府機構) 對實質問題與影響差異的立論。開放式、多重編碼對照與綜合的過程確立了最後主要的十項組的結果。本文研究透過互動式的討論程序來完成對研究問題之調查。最重要的目標是不寄望所有參與者均能將數次地對難以細分的 ERP 生命週期建置、管理與維護中所經驗的議題詳細了解。隨著建置 ERP 組織的成長以及組織內應用 ERP 的案例增加。研究者從 ERP 生命週期管理與維護中所帶來之問題與影響，將有效的分配及善用有限之組織資源，並有助於實現建置 ERP 系統之益處。

關鍵詞：企業資源規劃、企業系統、資訊系統主要議題
1 Introduction

Organizations in the public and private sectors face increasingly competitive domestic and international markets. They seek the means to achieve better business performance and competitive advantage through effective employment and management of their resources and business processes. To improve business performance, organizations need to have an efficient planning and control system that enables synchronization and planning across all processes of the organization. The key to competitiveness is a strong information systems’ (IS) infrastructure aligned with core business processes aimed at the delivery of high quality products and services to customers in the shortest possible time (AMR Research, 1998; Branchau et al., June, 1996; Porter, 1990). This in turn demands innovation, re-engineering toward integration of the organization’s business processes, and improved use of organizational resources (Applegate, 1994; Curran and Keller, 1998; Davenport, 1993; Hammer and Champy, 1993; Harrison, 1994; Malhotra, Y., 1993; Sauer and Yetton, 1997). These demands have, in the past two decades, led to the development of enterprise-wide information systems, enabling corporate activities to span organization functions and boundaries.

A new class of packaged application software has emerged over the past decade, ostensibly consolidating under a single banner, a multi-billion dollar industry that includes the world’s forth largest software vendor, various other large software firms and the world’s largest management consulting organizations (Gable et al., 1997, 1998). Frequently called enterprise resource planning systems (ERP), enterprise-wide systems or enterprise systems, these comprehensive, packaged software solutions seek to integrate the complete range of an organization’s processes and functions in order to present a holistic view of the business from a single information and information technology (IT) architecture. ERP is a business operating system that enables improved resource planning and execution for more efficient delivery of higher quality products and services to customers. In recent years, ERP systems have begun to revolutionise the means by which organizations conduct their business. ERP systems automate core corporate activities such as manufacturing and the management of finances, human resources and the supply chain, while eliminating complex, expensive links between systems and business functions (Bingi et al., 1999; Gable et al., 1997, 1998; Klaus et al., 2000; Parr et al., 1999; Rosemann and Wiese, 1999). ERP systems assist in reducing paperwork, decreasing human error, increasing accuracy and improving productivity. Furthermore, ERP systems, if adequately integrated into the organizational use of IT, can represent significant strategic value to the organization in terms of accelerated decision making, cost reduction and providing management better control over the entire business process.
More recently, organizations worldwide are moving away from developing IS in-house and are spending billions of dollars annually on implementing ERP systems and other packaged software. In 1995, Price Waterhouse IT Surveys predicted that by the year 2000, two thirds of all business software would be purchased off the shelf. AMR Research (1998) also predicted that the worldwide market for enterprise application packages, exclusive of all related hardware and implementation costs, would grow from $14.8 billion in 1998 to $52 billion by 2002. Despite the fact that the rate of ERP sales showed no growth or even declined in late 1999 for the primary vendors (i.e., SAP, Oracle, PeopleSoft, JD Edwards, Baan) due to, amongst other reasons, Y2K curtailment in IS activity and saturation of large organizations, the outlook through to 2004 is for a compound annual growth rate of 11.4% for license, maintenance and related service revenue associated with ERP systems (IDC Software Research, 2000).

Although ERP promises more effective resource planning and execution, together with improved product and service delivery, most organizations have not fully realized the benefits provided by such systems. Warnings in IS literature (e.g. (Boston Consulting Group, 2000; Davenport, July-August, 1998; Gable et al., 1997; Martin, 1998)) have become widespread. Such warnings include the failure of more than 40% of large software projects, the fact that 90% of ERP implementations are late or over and 67% of enterprise application initiatives could be considered negative or unsuccessful. These difficulties with implementation, management and ongoing support for ERP systems suggest that many organizations underestimate these issues and problems frequently encountered throughout the ERP lifecycle.

Implementing an ERP system is the largest and most complex project many organizations will encounter, entailing considerable potential benefits and risks. ERP lifecycle management and support is an ongoing concern rather than a destination. The pre-implementation, implementation and post implementation stages continue throughout the lifetime of the ERP system as it evolves with the organization (Dailey, A., 1998). Figure 1 shows major repeating lifecycle stages and associated phases. Unlike the traditional view of operational IS that describes a system lifecycle in terms of development, implementation and maintenance, examination of ERP implementations reveals that their lifecycle involves major iterations. Following the initial implementation, there are subsequent revisions and re-implementations that transcend what would normally be considered system maintenance.

As with many other technologies, organizations typically exhibit a significant time gap between the implementation stage and the reaping of benefits resulting from effective management of the new technology (Lu and Guimaraes, 1988). Though the technology for ERP has been available for several years, its full potential is yet to be fully realized. While ERP is growing in popularity and potential,
there appears to be insufficient insight into the major issues involved in implementing, managing and providing adequate support for the various stages of the ERP lifecycle. The three key players - the ERP software vendors, consulting firms and client organizations - are continually facing difficult judgements when dealing with the major issues regarding ERP lifecycle implementation, management and support. As the number of organizations implementing ERP increases and ERP applications within organizations proliferate (Bancroft, 1998; Davenport, 1996; Hiquet et al., 1998; Shtub, 1999) improved understanding of ERP lifecycle implementation, management and support issues is required in order to effectively allocate development, management, and training resources (Gable et al., 1998). Understanding ERP lifecycle issues will also help direct the ERP research agenda. Sustained interest in implementing and realizing the benefits of ERP systems and the consequent lifecycle issues provides the rationale for this study, which deals specifically with major ERP lifecycle implementation, management and support issues in the context of the Australian public sector.

1.1 Purpose of the Article

This article reports a case study, which examined the introduction of the SAP Financials in five closely related Queensland Government agencies. Despite SAP Financials having been in place since late 1998 within these agencies, new issues associated with the ongoing support and evolution of the SAP Financials have continued to arise. Herein are also presented findings from a three-round, non-anonymous Delphi-type survey, designed to understand and explicate major issues in relation to ERP lifecycle support within the five government agencies.
### 1.2 Conceptual Analysis and Report Presentation Framework

ERP lifecycle-wide implementation, management and support are ongoing concerns. Dailey, A. (1998) suggests that implementation is not a single process of configuration but rather involves many parallel processes that must be managed in a rigorous fashion. In addition, he believes that while much of the market focus and effort has been placed on implementation, users are finding post-implementation life extremely difficult. Because all of the focus in past projects was around “going live”, little emphasis was placed on the system lifecycle-wide management and ongoing support. Consequently, many users have found that post-implementation issues surrounding upgrades and system changes are more challenging than the implementation itself.

During the study we have developed an ERP lifecycle framework (Figure 2) as one tentative means of structuring issues identified in the Delphi survey rounds and for understanding the contextual background of the government agencies. The framework is based in the literature (e.g. (Carr, 1988; Dailey, A., 1998; Davis and Olson, 1985; Kwan, 1989)) and in a series of early interviews with senior agency staff.

Although the original purpose of the ERP lifecycle was to aid respondents in identifying issues, it was not employed solely as a communication device, but also as a valuable tool for analyzing issues identified by respondents, as a conceptual map, and a means of categorizing issues and examining possible relationships between the issues. Because ERP implementation requires the integration of structures, processes and systems across traditional organizational and functional
boundaries, a similarly diverse yet integrated perspective is required to understand the full ERP lifecycle. By eliciting issues from a broad stakeholder group and analyzing those issues through an organizational lens, the aim was to achieve a holistic understanding of the major issues of the ERP lifecycle.

The next section reports the main forces shaping the environment of the Queensland budget sector. This forms the context of the ERP implementation and the background to development of a new generation Queensland Government Financial Management System (QGFMS) and based on the SAP infrastructure. This section also describes the organizational context of the five closely related government agencies. Section 3 summarizes the research methodology applied in this study. The overall results and a set of 38 sub-issues associated with 10 major issue categories, related to the level of success of the project are discussed in section 4. Finally, several broad conclusions are drawn.

2 The Queensland Budget Sector Environment

The Queensland public sector comprises three distinct categories of service delivery agencies (Niehus et al., 1998): (1) Departments, including their related agencies (commercialized business units) e.g. State Water Project and DPI Forestry, (2) Government owned corporations (corporatized statutory bodies) e.g. Energex, and (3) Other general statutory bodies (e.g. Arts Council, Wheat Board). Departments are accounted for through the public accounts, which consist of the Consolidated Fund and various Trust and Special Funds. Some areas within departments are being commercialized as business units. Departments bid for resource allocations as part of the annual Budget cycle and process. Government owned Corporations operate, as far as practicable, on a commercial basis and are accounted for outside of the public accounts. They have their own business revenue base and are expected to pay the public sector equivalent of taxes to the State to source funds on commercial terms and to provide the Government with a return on capital by way of dividends. Statutory bodies are also accounted for outside of the public accounts and report separately to the Parliament.

2.1 Managing for Outcomes in Queensland Government

The Queensland Government has a commitment to deliver high quality, client-responsive services while maximizing value for money in their delivery. Major managerial reforms in the public sector since 1991 and the introduction of program management have shifted the emphasis of budget sector accountability from inputs and compliance with detailed procedures to accountability for outputs and results. Departments are now required to provide an annual report to the appropria-
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ate Minister for tabling in Parliament. These reports are public and are required
to include financial statements and comments on program performance relative
to performance indicators identified in the strategic plan. In 1994, the Queens-
The requirements of the new strategy placed demands on all agencies to upgrade
financial management activities including the adoption of accrual accounting prin-
ciples. For a number of agencies, commercialization practices were required. To
this end, Queensland Treasury initiated a review of the Queensland Government
Financial Management System (QGFMS) with the aim of providing a greater
range of business benefits for all budget sector agencies across commercial and
non-commercial environments.

Thus, related initiatives, which were shaping the budget sector environment,
were standard financial reporting, accrual accounting and accrual output budget-
ing. This commitment is being underwritten by the implementation across depart-
ments of Managing for Outcomes (MFO) - an integrated planning, budgeting and
performance management framework, which aims to: (1) Promote quality, client
responsive services, (2) Maximize value for money in service delivery and (3)
Improve resource allocation decision making (Treasury, 1997). As Queensland
takes this further step in improving its financial management, the business needs
of Queensland Government agencies will be significantly upgraded. Queensland
Treasury, as the lead Agency for QGFMS, has the responsibility of providing
leadership in ensuring that resource management systems meet these emerging
business needs. Figure 3 shows the needs and practice of MFO in the Queensland
budget sector. A standard accounting environment driven by central government
regulation combined with other centrally driven reporting requirements and stan-
dard software provided this excellent research opportunity.

2.2 Overview of the QGFMS

The QGFMS is the first common software used statewide in any Australian state to
contribute to the continual improvement of financial management within the pub-
lic sector (Mason, 1992). The old generation of the QGFMS environment was first
established in 1983 with Management Sciences of America (MSA) software; now
Dun and Bradstreet (DBS). The old QGFMS was installed on a Hitachi mainframe
computer at the Government’s Center for Information Technology (CITEC) in
Brisbane, and run under an MVS environment with online access through CITEC.
As each agency accessed its own suite of data files and system policy, security and
reporting libraries could be tailored to suit individual agency needs.

Over a decade later the government reaffirmed strong support for central co-
ordination of financial information systems as a fundamental strategy for under-
pinning sound financial management in the government budget sector (Treasury,
A User Requirement Analysis (URA) was conducted in 1993. This was an extensive review of agencies’ requirements and revealed significant functionality gaps between user requirements and the then current generation QGFMS. There were two major issues to emerge from the URA. The first issue was that the functionality requirements for decision support systems, integrated asset management, project costing, integrated sales and distribution, sophisticated inventory and purchasing and workflow automation could never be addressed by their current generation QGFMS. The second issue was that agencies needed an open system that integrated with their agency specific systems.

While a stand alone Decision Support System could meet some of these requirements, environmental scanning of the market indicated that new technology was available with a close degree of fit to the Agencies’ new requirements from the URA. Following the review of user requirements undertaken in the second half of 1993, a cross-agency Project Board initiated a Request for Information (RFI) in July 1994 to examine the availability of integrated financial management software to provide an alternative to existing software. As a result of the evaluation of RFI responses, a Request For Offer (RFO) was made in October 1994 to three potential suppliers of systems that had met the mandatory requirements. Subsequently passing acceptance tests in December 1994, SAP Financials was chosen as the application system to become the new generation of QGFMS to all government agencies. By the end of 1999, most agencies had completed their initial SAP Financials implementation.
2.3 The Five Closely Related Government Agencies Project

In 1996 five closely related government agencies using common consulting services, commenced implementing SAP Financials as a team, to proactively support the Queensland Government Financial Management Strategy (Managing for Outcomes). Table 1 summarizes the mission, size, revenue and structure of the five agencies in the year 2000. SAP Financials (version 3.1H) went live in these agencies during late 1998 and early 1999.
Table 1: Demographics of the Agencies Studied for Their Implementation of SAP Financials

<table>
<thead>
<tr>
<th>Agency</th>
<th>Business Description</th>
<th>Annual Revenue (99-00)</th>
<th>Employees (99-00)</th>
<th>Mission</th>
<th>Organizational Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency A</td>
<td>Agency A was established in 1996 to meet the corporate services needs of both Agency B and Agency D, and other clients that may exist from time to time.</td>
<td>$22M</td>
<td>280</td>
<td>Delivery of quality corporate services covers the aspects of Finance, Human Resources, administrative and Corporate Information Systems capabilities.</td>
<td>Business Advisory, Support Services, Corporate Information Systems, Development and Strategy, Business Advisory</td>
</tr>
<tr>
<td>Agency B</td>
<td>Agency B was established in February 1996. The Department focuses on the integrated management and development of the State's natural resources - land, water and native vegetation.</td>
<td>$118M</td>
<td>3800</td>
<td>To support the economic security of Queensland through the sustainable use, development and management of land, water and native vegetation resources, while protecting the rights and interests of the individual and the community.</td>
<td>Land Services, Resource Management, Resource Sciences and Knowledge, Regional Infrastructure Development, Commercial Water Services, Corporate Management, Land Court, Land &amp; Tribunal Business Advisory</td>
</tr>
<tr>
<td>Agency C</td>
<td>Agency C was created as a commercial business group within Agency B from July 1997. The group develops and manages State owned water infrastructure and provides water to about 7000 customers throughout Queensland.</td>
<td>$82M</td>
<td>580</td>
<td>To increase Queensland's productivity by continually improving water services and infrastructure on a commercial basis.</td>
<td>Operations &amp; Maintenance, Engineering Services, Asset Development and Management, Business Development &amp; Customer Service, Finance &amp; Corporate Support, Water Management</td>
</tr>
<tr>
<td>Agency D</td>
<td>Agency D is a rural economic development agency that aims to develop Queensland's primary industries into a confident competitive force in the world market. The Department is focusing on meeting the needs of the consumers of food and fibre products.</td>
<td>$375M</td>
<td>4000</td>
<td>For innovative food and fibre industries: confident communities.</td>
<td>Corporate Performance, Policy Analysis &amp; Industry Development, Animal &amp; Plant Health Service, Rural Industry Business Services, Forestry, Fisheries Service, Agency for Food &amp; fibre Sciences</td>
</tr>
<tr>
<td>Agency E</td>
<td>Agency E was established as a Agency D commercial business group and Queensland's major forest grower in July 1995. The group is responsible for managing and marketing state-owned forest and quarry material resources to earn commercial returns.</td>
<td>$94M</td>
<td>175</td>
<td>To manage State owned plantation and native forest timber resources, quarry material resources and other forestry related services in a sustainable manner to earn commercial returns.</td>
<td>Production, Marketing, Forest Industry Development, Business Services, Queensland Forestry Research Institute</td>
</tr>
</tbody>
</table>
As at 2000, the five government agencies employ approximately 8000 staff located throughout Queensland. Agency A was established 1 July 1996 to provide enhanced corporate services (e.g. financials, human resources and administrative services) delivery to Agency B and Agency D together with their commercialized units Agency C and Agency E, through the integration of operational corporate processing functions of these agencies. This development enabled all five agencies to focus their remaining strategy and policy functions on improving service delivery to their customers. Agency A, as lead agency in SAP Financials implementation, management and support, is responsible for the development, operation and support of the system to its client agencies.

3 Research Methodology

A Delphi-type, 3-round, non-anonymous, open survey using personalized email with attached survey instruments was employed in order to systematically identify and determine the major issues from the perspectives of individuals who have been closely involved with SAP Financials implementation, management and support. A critique of the Delphi method, its advantages, inherent issues and design in the context of IS key issues studies and its application within the current study is discussed in Chang and Gable (Chang and Gable, 2000). The objective of the first round of the study was to “inventory” the major issues experienced to that time. Having structured a preliminary set of major issues, a second survey round sought confirmation of this set of issues and further comments. After reviewing the feedback from the first two rounds, a final round sought respondents’ scores on the relative importance of the major issues.

In the process of coding and synthesizing the survey responses, several potential coding schemes (e.g. MIT90’s framework, ERP lifecycle framework, open coding) were examined and tested. Qualitative research literature (Gadamer, 1977; Hammer and Champy, 1993; Lacity and Janson, 1994; Ramm, 1970; Tesch, 1991) has also served as a guide to coping with the types of coding and synthesis issues (e.g. how to deal with a large amount of non-numerical, unstructured and rich data; how to ensure that when synthesized, those issues accurately reflect the respondents’ intentions) that confront Delphi method researchers. Two coders were involved in the open coding procedure. This involved firstly, the coders working individually through the open coding procedure, and then comparing results from each coder and resolving differences. The multiple coders’ exercise was used to ensure coding reliability. Using a variation of the nominal group technique, a panel of domain experts from the government agencies then examined the resulting coding scheme to establish content validity. Discrepancies were discussed within the research team. A multiple coders’ exercise was then used to test cod-
Table 2: Summary of the Coding Methods and Synthesis Procedures

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Who was involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distill the preliminary sets of major issues from the individual raw issues using either a predefine coding scheme or an open coding approach.</td>
<td>Research team members</td>
</tr>
<tr>
<td>• Code the responses.</td>
<td></td>
</tr>
<tr>
<td>• Revise as necessary.</td>
<td></td>
</tr>
<tr>
<td>• Establish the results of the preliminary sets of major issues.</td>
<td></td>
</tr>
<tr>
<td>Examine the resulting preliminary sets of issues and attempt to understand the interrelationships between categories.</td>
<td>Research team members</td>
</tr>
<tr>
<td>• Contrast and compare the results of alternative coding methods.</td>
<td></td>
</tr>
<tr>
<td>Combine and map the researchers’ results into a coherent tentative set of major.</td>
<td>Research team</td>
</tr>
<tr>
<td>• Contrast and compare the results of researchers’ preliminary sets of major.</td>
<td></td>
</tr>
<tr>
<td>• Establish the results of a tentative set of major issues.</td>
<td></td>
</tr>
<tr>
<td>Seek confirmation of the resulting tentative set of major issues with agencies’ representatives and survey respondents.</td>
<td>Research team Agency reps / Survey respondents</td>
</tr>
<tr>
<td>• Apply appropriate checks for content validity and coding reliability.</td>
<td></td>
</tr>
<tr>
<td>• Interact with agencies representatives and survey respondents.</td>
<td></td>
</tr>
<tr>
<td>Finalize a master set of major issues that are relevant to further survey participates.</td>
<td>Research team</td>
</tr>
<tr>
<td>• Establish the results of the master set of major issue.</td>
<td></td>
</tr>
</tbody>
</table>

An understanding of the contextual background of the Queensland budget sector and the study organizations in relation to their SAP Financials project was essential (i.e. organizational nature/background, major services / roles / respon-
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sibilities of the agency, history/initiatives of the financial management system, overview of agencies’ SAP project). A case study protocol was developed to provide guidelines and interview questions for directing the multiple case studies. The contextual data were gathered using multiple sources including interviews, meetings, surveys, observation and archival records to outline the study cases for migrating existing financial management systems to the new generation of QGFMS based on the SAP Financials package (these are traditionally considered the tools of fieldwork - Yin (Yin, 1994)).

4 Results and Discussion

4.1 The Overall Results

Individuals from the implementation partner (a “big 5” consulting firm) and five closely related government client agencies were pre-identified and contacted for participation in the study. To qualify for participation in the study, individuals were required to possess substantial and diverse involvement with SAP Financials at different levels, in various roles, in diverse phases of the lifecycle with any of the modules implemented. Through a pre-study interviews with senior sponsors from each agency, a total of 117 individuals, which roughly represents the entire population of the project’s participants, were identified and included in the contact database.

117, 61 and 100 questionnaires were distributed in three sequential survey rounds to individuals who have had substantial involvement with the five government agencies’ SAP project. Certain individuals indicated their inability to further participate after the first round survey. Reasons for non-participation included: some respondents had discontinued their SAP responsibilities, others had left the organizations or were on holiday/maternity leave, and several respondents did not want to participate because of the time required to complete the questionnaires. Prior to e-mailing, the survey instruments were pre-tested for clarity and ease of understanding by several senior personnel within the government agencies. Considerable changes were made. In round one (the ‘inventory’ round), a total of 78 questionnaires were returned, yielding a 67% response rate. A total of 274 issues from 61 valid questionnaires were eventually obtained from the first round survey providing a net response rate of 52%, and 4.5 issues per respondent on average.

Soon after round 1, a domain experts’ workshop, which aimed to examine and identify the optimal set of major issues and related sub-issues for the final ‘weights’ round survey, was conducted. The workshop was organized to allow time for information sharing and discussion with the participants as well as the presenters. The workshop yielded valuable insight and a greater level of under-
standing of SAP Financials issues in the agencies and resulted in a preliminary set of major issue categories and sub-issue categories that were expected to be more relevant and meaningful to the study stakeholder groups.

The coding and synthesis procedures in round one resulted in a tentative set of major issue categories and sub-issue categories. Having rationally synthesized and logically structured a preliminary set of major- and sub-issues in the second round survey (confirmation round), respondents’ comments on, and confirmation of, this issues framework was sought. In this ‘confirmation’ round, a total of 61 questionnaires, clearly cross-referencing the respondents’ original, verbatim issues to the tentative set of major issues, were distributed to individuals who had responded to the first round survey. Despite the instruction to participants that they need not formally respond if they agreed in principle with the tentative set of major issues and our mapping, about one-quarter of the questionnaires were returned indicating support for the preliminary categorization.

The comments on, and confirmation of, the issue categories from the domain experts’ workshop and the Round-Two survey respondents resulted in a minimally revised master set of major issue categories from M-1 to M-10 with sub-issue categories from S-1 to S-38 (Table 3). Using the incidence of overall citation as an early crude indicator of issue severity, it is noted that 63% (172) of all 274 initial issues cited pertain to: Operational Deficiencies (67 citations), Knowledge Management (55 citations), and System Development (50 citations). It must be noted that the number of sub-issue categories in other major-issue categories than these three, were relatively few, and that not all issues listed were issues for all respondents. Nonetheless, the aim of the study was to be as inclusive as possible in this master set of issues, for further relative evaluation in the next “weights” round of the survey. Figure 4 shows the incidence of the initial 274 issues from the sixty-one respondents across the ten major-issue categories.

In the final survey round, respondents were asked to rate the relative importance of the 38 sub-issues (1-10 point scale, where 10 = very important and 1 = unimportant). A total of 58 questionnaires were returned in this ‘weights’ round, yielding a 58% response rate (100 contacts in this round included non-respondents in the first round). Prior to distribution through e-mail, round 3 survey instruments were pre-tested for clarity and ease of understanding by several senior personnel in the government agencies. Slight changes were made. A total of 42 valid questionnaires were eventually obtained from the final ‘weights’ round survey, providing a net response rate of 42%.
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### Table 3: Nomination and Distribution of the Related Sub-issues

<table>
<thead>
<tr>
<th>Sub-Issues</th>
<th>Responses</th>
<th>Respondents</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity (&amp; therefore cost) of SAP far exceeds the requirements of some agencies</td>
<td>1 1 2 3 2 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complexity of SAP drives costs beyond reasonable limits</td>
<td>2 1 3 5 6 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs of SAP exceed those of QGFMS without commensurate benefit</td>
<td>3 1 4 7 4 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAP implementation benefits do not justify costs</td>
<td>4 1 7 11 8 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Errors were found in data converted from former QGFMS</td>
<td>5 2 9 15 8 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult to retain people with SAP skills due to market pressure to leave</td>
<td>6 3 10 16 11 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insufficient resources and effort put into developing in-house knowledge</td>
<td>7 3 4 7 4 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training provided was inadequate and did not cover the diversity of circumstances encountered in normal daily operations</td>
<td>8 3 24 39 27 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared knowledge among project team members was a problem - agency staff did not understand SAP and implementation personnel did not understand agency requirements</td>
<td>9 3 10 16 10 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System documentation is inadequate, particularly with respect to system design and controls</td>
<td>10 3 3 5 3 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of consultation with operational level users meant that operation requirements were not met</td>
<td>11 4 6 10 8 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing reports is difficult in SAP</td>
<td>12 5 5 8 5 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not all required reports were available at implementation time</td>
<td>13 5 10 16 10 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational deficiencies impacted on the accuracy and efficiency of operations and the ease of use of the system</td>
<td>14 5 18 30 33 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persistent minor errors and operational issues have not been rectified</td>
<td>15 5 3 5 4 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAP is not sufficiently integrated with other systems</td>
<td>16 5 3 5 3 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAP lacks some functionality of QGFMS</td>
<td>17 5 3 5 3 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security is difficult to maintain in SAP resulting in some users being granted too much access and others not having access to data they need</td>
<td>18 5 8 13 9 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differences in work ethic among project personnel</td>
<td>19 6 2 3 2 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversity of government systems makes integration difficult</td>
<td>20 6 2 3 2 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation across multiple agencies led to sub-optimisation of the system configuration</td>
<td>21 6 6 10 6 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of leadership at senior levels</td>
<td>22 6 3 5 4 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of ownership/responsibility by agency personnel at the project level</td>
<td>23 6 4 7 4 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political issues had a negative impact on the project</td>
<td>24 6 3 5 3 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor communication between agencies</td>
<td>25 6 1 2 2 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation timing was inappropriate because of change underway in the public sector</td>
<td>26 5 8 5 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization appears unable or unwilling to be responsive to requests for changes in the system to resolve operational problems</td>
<td>27 7 4 7 7 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ongoing support for the SAP system is inadequate</td>
<td>28 8 8 13 8 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support personnel are inadequately trained</td>
<td>29 8 6 10 6 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complexity of SAP means few, if any, people understand SAP beyond a single module, making overall design decisions very difficult</td>
<td>30 9 7 11 8 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of SAP upgrades places a large burden on system maintenance</td>
<td>31 9 2 3 2 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency with which requirements changed caused problems for developers</td>
<td>32 9 3 5 5 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate system testing left many errors in the implemented system</td>
<td>33 9 4 7 5 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issues that arose during, or result from, the development phase of the SAP system</td>
<td>34 9 12 20 15 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requested system functionality was sacrificed in order to meet implementation deadlines</td>
<td>35 9 3 5 3 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The project team was disbanded when the system was handed over despite many issues remaining unresolved</td>
<td>36 9 2 3 2 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too little effort was put into redesigning the business processes, resulting in a system that represented a ‘technology swap’ that failed to capture many of the benefits of SAP</td>
<td>37 9 10 16 10 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System performance is inadequate to meet operational requirements</td>
<td>38 10 15 25 17 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.2 The Major Issue Categories and Related Sub-Issue Categories

During the “weights” round survey, respondents were asked to rate the importance of each of the 38 sub-issue categories across the six lifecycle phases (Table 4) on a scale from 1 to 10. Based on valid responses, it is observed that most respondents have scored the Up-and-Running phase, while other phases received notably fewer scores. This reflects both the fact that a preponderance of respondents became involved later in the lifecycle, as well continuing problems with managing and supporting the operational ERP system, beyond initial implementation.

Table 5 identifies issue frequency by lifecycle phase. In this paper, we do not further analyze scores across the phases. Rather, analyses of weights presented herein are based on the mean of scores across the phases and more detailed cross-phase analysis and interpretation is left for future attention.

Table 6 shows the overall mean scores and rankings of the ten major issue categories from the “weights” round survey (where the mean for the major issue category is simply the average of the mean scores for its constituent sub-issue categories - see Table 3 for groupings of sub-issues within major-issues). Forty-two respondents, each responding to thirty-eight sub-issues, could have resulted in a maximum of 1596 scores, but only 1134 scores were returned, indicating 29% missing data ((1596-1134)/1596 responses missing because not all respondents were able to respond to all sub-issues). The number of computed responses (N) for each major issue category will be larger where more sub-issues are associated with that category. The number of respondents varies between twenty-nine and thirty-four across the sub-issue categories from which major issue category scores were derived. While the respondents were not drawn from a random sample of
## Table 4: Sample of the “Weights” Round Survey Questionnaire

<table>
<thead>
<tr>
<th>Key Issues and Their Rationale</th>
<th>Plan</th>
<th>Build</th>
<th>Test</th>
<th>Install</th>
<th>Know</th>
<th>Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue 1 description</td>
<td>10</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issue 2 description</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issue 3 description</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:
- In this example, the respondent felt that Issue 1 was extremely important during the “build” phase, decreasingly important during subsequent phases, and not very important in terms of “knowledge management”.
- In this example, the respondent feels that Issue 2 is “moderately” important across all phases of their involvement. Note that they were apparently not involved in the “plan” or “run” phases.
- Here the respondent has indicated they do not feel they are able to respond regarding Issue 3. Please mark an X only against issues for which you cannot express an opinion.

## Table 5: Issue Frequency according to Lifecycle Framework

<table>
<thead>
<tr>
<th>Stages of Lifecycle</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>Build &amp; Design</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>Testing</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Implementation/Installation</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>Knowledge Management</td>
<td>105</td>
<td>39</td>
</tr>
<tr>
<td>Up-and-Running</td>
<td>58</td>
<td>22</td>
</tr>
<tr>
<td>Indeterminate</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>274</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

18
Table 6: The Overall Ranking of Major Issue Categories

<table>
<thead>
<tr>
<th>M-#</th>
<th>Mean</th>
<th>Max</th>
<th>Min</th>
<th>N=42</th>
<th>Std Dev</th>
<th>Mode</th>
<th>Rank</th>
<th>Major Issue Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>6.19</td>
<td>10</td>
<td>1</td>
<td>34</td>
<td>2.53</td>
<td>8</td>
<td>1</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>9</td>
<td>6.00</td>
<td>10</td>
<td>1</td>
<td>32</td>
<td>2.34</td>
<td>8</td>
<td>2</td>
<td>System Development</td>
</tr>
<tr>
<td>8</td>
<td>5.79</td>
<td>10</td>
<td>1</td>
<td>31</td>
<td>2.68</td>
<td>8</td>
<td>3</td>
<td>Support</td>
</tr>
<tr>
<td>2</td>
<td>5.69</td>
<td>10</td>
<td>1</td>
<td>29</td>
<td>2.97</td>
<td>9</td>
<td>4</td>
<td>Data Conversion</td>
</tr>
<tr>
<td>5</td>
<td>5.62</td>
<td>10</td>
<td>1</td>
<td>34</td>
<td>2.73</td>
<td>1</td>
<td>5</td>
<td>Operational Deficiencies</td>
</tr>
<tr>
<td>4</td>
<td>5.58</td>
<td>10</td>
<td>1</td>
<td>32</td>
<td>2.53</td>
<td>7</td>
<td>6</td>
<td>Lack of Consultation</td>
</tr>
<tr>
<td>1</td>
<td>5.25</td>
<td>10</td>
<td>1</td>
<td>29</td>
<td>2.86</td>
<td>7</td>
<td>7</td>
<td>Cost and Benefit</td>
</tr>
<tr>
<td>6</td>
<td>5.06</td>
<td>10</td>
<td>1</td>
<td>32</td>
<td>2.70</td>
<td>8</td>
<td>8</td>
<td>Organizational Context</td>
</tr>
<tr>
<td>7</td>
<td>4.79</td>
<td>10</td>
<td>1</td>
<td>30</td>
<td>2.84</td>
<td>1</td>
<td>9</td>
<td>Intransigence</td>
</tr>
<tr>
<td>10</td>
<td>4.28</td>
<td>10</td>
<td>1</td>
<td>33</td>
<td>2.82</td>
<td>1</td>
<td>10</td>
<td>System Performance</td>
</tr>
</tbody>
</table>

Avg 5.57 29.80 2.67 4.92

organizations or industries, and though the number of respondents was relatively small, these views do represent a range of stakeholder groups (e.g., client organizations and consulting firms) regarding the study of major issues with the implementation and subsequent operation of SAP Financials within the public sector. The study was not intended to build or test any specific theory, but rather offer important insight into the needs of the stakeholder groups and for further relevant research in the area of ERP. The following sub-sections provide an overall understanding and discussion of ERP lifecycle implementation, management and support issues in the five government agencies.

4.2.1 Knowledge Management

Sixty-four percent of respondents in the initial inventory round identified 55 issues with knowledge management, the second largest number of citations for a major-issue category in that survey round. Based on final-round weights, this major-issue category is ranked most important overall (mean = 6.19, rank = 1). Respondents indicated difficulty with retaining personnel with SAP skills due to then market demand, and insufficient resources and effort to develop in-house knowledge. Dedicated resources are critical to realising the benefits associated with an ERP package (Robinson and Dilts, 1999). Shared knowledge among project team members was a problem - agency staff did not understand SAP, and implementation per-

*In interpreting the sub-issues, and major issue categories, reference was made to the original issues supplied by respondents as well as the rich information base gathered on the case studies.*

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sonnel did not understand agency requirements. In light of this, user training was inadequate and did not cover the diversity of circumstances encountered in normal daily operations. As a minimal requirement, everyone who is involved with, and uses, ERP systems needs to be trained on how they work and how they relate to the business process early in the implementation process. Organizations should also provide training opportunities on a continual basis to enhance their employees’ skills and better prepare them to meet the changing needs of the business and their occupational duties within (Bingi et al., 1999).

A stable team of SAP skilled personnel would promote the smooth running of SAP. The acquisition and maintenance of skilled resources has proved both difficult and expensive. Incentives aimed at securing qualified staff loyalty have been misused or inappropriately applied. When SAP is implemented, it is important to retain the knowledge and skills gained by the staff involved on the project, and to ensure that sufficient ongoing training is provided within the agencies and converted to institutional knowledge. Although organizations use consultants as an implementation partner to assist during the implementation process, it is important that knowledge is transferred from the consultant to those internal employees whose task will require long-term interaction with, and application of, the system (Davenport, July-August, 1998).

4.2.2 System Development

Forty-nine percent of respondents in the inventory round identified 50 system development-related issues as important (3rd most cited major-issue category in round 1). This major issue ranks second in overall importance based on round 3 weights. Respondents indicated: the complexity of SAP means that few, if any, people understand SAP beyond a single module thereby making overarching design decisions very difficult; the frequency of SAP upgrades placed a large burden on system maintenance; the frequency with which requirements changed caused problems for developers; inadequate system testing left many errors in the implemented system; requested system functionality was sacrificed to meet implementation deadlines; the project team was disbanded once the system was handed over despite many issues remaining unresolved; and little effort was put into redesigning the underlying business processes resulting in a system that represented a ‘technology swap’, thereby constraining benefits realisable†.

Evidence from respondents suggests that an in-depth understanding of SAP is difficult to obtain and its lack has an enormous impact on the ability to use the system efficiently and effectively. Recent research also suggests that deficient ERP product knowledge has been a major concern in the late 1990s (Davenport, July-August, 1998).

†Subsequent discussions and workshops with representatives of the service providers, suggested that the initial implementation was designed to be a technology swap.
July-August, 1998; Markus et al., 2000) for many organizations. Although several knowledgeable ‘experts’ in particular modules of SAP were involved, none seemed to have broad knowledge and expertise across SAP. Continuing development of internal skills within SAP and ensuring that appropriate primary and secondary functional support is in place for each SAP module is believed to be the key to addressing these issues. Furthermore, in today’s competitive business environment, flexibility and the ability to rapidly adapt are important in maintaining a competitive advantage. It is therefore critical that the hardware and software infrastructure of the system supports future changes within the business. The ability to upgrade the system’s performance with minimal disruption and cost is therefore an important issue (Holland and Light, May-June, 1999; Markus et al., 2000; Somers and Nelson, 2001).

4.2.3 Support

Twenty percent of respondents in the inventory round specified 14 issues related to ongoing support (ranked 7th based in inventory-round citations). Support ranks third overall in importance based on final round weights. Respondents suggest that ongoing support for the SAP system is inadequate and that support personnel are inadequately trained. Most respondents stated that staff members who gained knowledge of SAP on the development team have since left the agency’s employ and were not replaced by equally knowledgeable or qualified staff. This remains a major issue of post “go-live” concern. Also lacking was sufficient training for Help Desk personnel and preparation of appropriate security profiles and controls for support staff. Although a number of issues post “go live” tended to give the impression that more support was required, it is believed that many of these could have been eliminated earlier with a more thorough user-acceptance testing process.

Without proper support, life cycle-wide implementation, management and support of the system can be derailed. The need for continuing support beyond implementation must be given sufficient consideration in initial planning stages (Davenport, July-August, 1998; Markus et al., 2000). Client agencies must

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Thus we note substantively different ranks based on the relative incidence of 1st round citations, versus final round mean scores (or weights). As implied earlier, 1st round citations were known to be crude early indicators of relative importance. We see from the weights round, that while certain issues may have been at the forefront of respondents’ thinking in the inventory round, when faced with a complete list of issues in the weights round, issues cited by a respondent are not necessarily weighted by them as the most important. Another possible explanation for the difference in ranks is that the respondents in the weights round are not exactly the same as those in the inventory round, though there is much overlap. The real purpose of counting citations in round 1 was to instantiate the framework prior to the weights round. Subsequent comparative analyses are based solely on means derived from weights.
Major Issues with Enterprise Systems

ensure that necessary resources are available post “go live”, to promptly handle issues that arise outside of optimal operating conditions. Ongoing adequate and appropriate training must also be made available to the support staff. ERP systems are a way of life and may be a lifelong commitment for many organizations (Davenport, 1996). There will always be new versions to upgrade to and room for improved compatibility between the business and the system. Consequently, ongoing support represents an important element with any packaged software, including extended technical assistance, emergency maintenance, updates and special user training (Holland and Light, May-June, 1999; Somers and Nelson, 2001).

4.2.4 Data Conversion

Thirteen percent of respondents in the inventory round indicated 8 issues suggesting that errors found in data converted from former financial management systems were of important concern. This major issue category is ranked fourth in overall importance based on round 3 weights. Example issues include, the new fields did not always encompass the old-field data, and ensuring accurate data transfer was difficult with some random omissions occurring. Perhaps the import program was not fully compatible between the previous source and the new destination systems. Somers and Nelson (2001) suggest that management of data entering the ERP system represents a critical issue throughout the implementation process. Data conversion problems can cause serious implementation delays and cost overruns (Markus et al., 2000; Lyytinen and Hirschheim, 1987). There is a need to ensure that the data adopted from prior systems is mapped into the correct fields and can be maintained indefinitely. Additionally, data conversion can be a very resource-intensive process that is frequently underestimated.

4.2.5 Operational Deficiencies

Forty-eight percent of respondents in the “inventory” round indicated 67 issues with operational deficiencies. Based on weights, this major issue category ranks fifth overall. Respondents indicated that: developing reports is difficult in SAP; not all required reports were available at implementation time; operational deficiencies impact on the accuracy and efficiency of operations and the ease of use of the system; persistent minor errors and operational issues have not been rectified; SAP is not sufficiently integrated with other systems; SAP lacks some of the previous financial management system functionality; and security is difficult to maintain in SAP, resulting in some users being granted excessive access and others lacking access to necessary data.

SAP was vastly different, in both presentation and functionality, to the previous QGFMS, of which the agencies had considerable experience, extending over
the period 1983 to 1998. During this 15-year period the agencies conducted significant customisation, particularly in reporting and enhancing their business processes. With the advent of SAP, the agencies were faced with abandoning a system they had been using for 15 years and forfeiting the knowledge, development, and sophistication of reporting that had evolved over that period. A major driver behind these issues is the standard reporting system in SAP, which is not suitable for some of the agencies. Some organizations found that the standard SAP reports do not offer the presentation and flexibility with which users are accustomed. A high level of technical knowledge is required resulting in clients buying separate tools or developing an in-house reporting system. It is noted that this is not a unique situation, but is typical of many SAP implementations. Extensive user training and acceptance testing would improve users’ ability to use the SAP system.

4.2.6 Lack of Consultation

Before an organization can begin ERP implementation, it must first deal with organizational issues. Organizational issues are those issues that affect people, process or product. The organization must be aware of the organizational issues likely to trigger problems when implementing the ERP system, and build an implementation strategy to support the issues. Ten percent of all respondents in the “inventory” round cited issues suggesting a lack of sufficient consultation with operational level users, resulting in operational requirements not being met. This major issue category ranks sixth in overall importance. Respondents indicated insufficient consultation with operational staff, e.g. systems staff running the former system, particularly with respect to interfaces and reports which had a lot of business rules and logic incorporated into the program. Some of these rules and logic were not carried across to the new system, resulting in additional work and problems. Therefore, to ensure an adequate implementation, management and support of the new system, sufficient prior consultation with users is necessary.

Lyytinen and Hirschheim (1987) state that information system failure has been defined as “the inability of an IS to meet a specific stakeholder group’s expectations.” Research from Ginzberg (1981) also suggests that successfully consulting and managing user requirements directly relates to successful systems implementation. The requirements of an organization may exceed the capabilities of the system or may be too trivial to require one. ERP systems often fail to meet requirements, despite positive contributions to the organization, if the systems are “oversold” by the vendor. Careful deliberation of success measurement and management of requirements through all stages of the lifecycle is thus an important factor.
4.2.7 Cost and Benefit

Twenty percent of respondents in the “inventory” round cited issues implying that agencies should balance costs with benefits realization. This major issue is ranked 7th based on weights. Respondents were of the view that the complexity of SAP exceeds the requirements of many agencies, and that it is this complexity that drives costs beyond reasonable limits in small agencies. It would appear that, for some agencies, implementation was considerably more costly than anticipated and expected benefits/outcomes are yet to be realized. The ERP system’s costs generally involve provision for software, consulting, process re-work, integration and testing, data conversion, data analysis, training, hardware, support and maintenance. Cost is a significant issue and is often beyond the expectation of the organization, e.g. organizations often based their cost provision entirely on system implementation without being aware of the costs before and after implementation.

Many researchers suggest that a key benefit of ERP is the seamless integration of information flowing through the organization (Markus et al., 2000; Holland and Light, May-June, 1999; Somers and Nelson, 2001). To successfully achieve this benefit, the business processes and functions must be integrated. Although it is likely that many benefits will not be realised for some time post-implementation, workshop participants indicated that the agencies had been able to accomplish tasks with SAP that would not have been possible with the previous system. With the aim of increasing benefits from the SAP investment, a continuous improvement process and benefits realisation program was established across the government agencies after the system’s “go live”.

4.2.8 Organizational Context

Twenty-eight percent of respondents in the “inventory” round cited 28 sub-issues related to the agencies’ organizational context (rank 8th). Respondents suggest that: differences in work ethics among project personnel; diversity of government systems which makes integration difficult; implementation across multiple agencies led to sub-optimisation of the system configuration; lack of leadership at senior levels; lack of ownership/responsibility by agency personnel at the project level; political issues had a negative impact on the project; poor communication between agencies; and inappropriate timing of implementation because of changes (i.e., new government, new accounting policy) occurring within in the public sector.

When a government is considering adopting an ERP package, one factor to consider is whether to adopt the same system across the entire government or allow each department to choose its own system. A key concern for the successful implementation of ERP systems across various government agencies is an organi-
zation culture that emphasises the value of sharing common goals over individual pursuits and the value of trust between partners, employees, managers and organizations. A guiding principle for the case firms studied was to adopt a common configuration across the multiple agencies. The implementation demanded substantive changes to the business and job functions, together with the inevitable internal reorientation for the client agencies. Willcocks and Sykes (2000) suggest that ERP benefits cannot be realised without strong coordination of effort and goals across business and IT personnel. This poses a challenge for management and will test the organization’s management style. The leadership style should facilitate the change and aide employees in coping with the new situation.

4.2.9 Intransigence

Five percent of individuals in the first “inventory” round indicated 7 issues related to reluctance to accept dissenting views, suggesting that the organization appears unable or unwilling to respond to requests for changes in the system - to resolve operational problems. This major-issue category is ranked ninth in overall importance. ERP can potentially create changes in virtually every department within an organization. Individuals are required to adapt to changes in the organization and changes in their job function. However, many people do not like change. They like to work in an environment with which they are comfortable. Therefore, when confronted with a massive change such as ERP implementation, resistance to the change itself or a personal fear or threat caused from the change in the organization emerges. It is important to recognise the interests of the business as a whole and of the users as individuals in this respect.

Managing change is a primary concern for many involved in ERP implementation. ERP systems introduce large-scale change that can cause resistance, confusion redundancies, and errors. It is estimated that half of ERP implementations fail to achieve expected benefits because organisations “significantly underestimate the efforts involved in changing management” (Davenport, July-August, 1998). Research has shown that effective change management is critical to successful technology implementation and business process reengineering (Hiquet et al., 1998). Therefore, Markus et al. (2000) suggest that organisations need to adopt a comprehensive approach toward the large-scale process and system changes associated with ERP implementations and make change everyone’s first priority.

4.2.10 System Performance

Twenty-five percent of respondents in the “inventory” round indicated 17 system-performance related issues. This major-issue category is ranked tenth in overall
importance. Respondents suggested a lack of project knowledge on system performance and planning for post-implementation. Also cited by respondents was the lack of preparedness of the facility’s managers and their consequent inability to respond appropriately to requests for assistance. System response time was inconsistent and therefore it was sometimes impossible to determine whether it was yet working in the background or “hung”. The wide area network was not stress-tested adequately, resulting in poor response times in certain locations. ERP systems generally require a highly scalable and available hardware platform and network infrastructure. Because of this, the platform and infrastructure need to be able to deliver the response-time characteristics required by ERP applications.

While successful ERP implementation is often determined by business and organisation changes, the infrastructure choices deserve thorough consideration during the planning and system procurement phase. Key infrastructure considerations, which should occur very early in the implementation process, revolve around centralisation or decentralisation, compatibility of existing tools within the organisation with the ERP system, and identification of bolt-ons, such as data warehouses.

5 Concluding Remarks

This article has presented issues relating to implementation, management and support of ERP software in five closely related government agencies. The SAP Financials module was selected to provide a platform for improved financial management for all agencies within the Queensland Government. A phased ERP lifecycle framework was employed to make sense of the material collected while conducting the multiple case studies and the Delphi survey of the five government agencies. Open coding and synthesis procedures resulted in a set of 10 major issue categories with 38 sub-issues.

This study also represents the first attempt to empirically identify and explicate the issues and important concerns for individuals substantially involved with the SAP Financials system within government agencies. A well-documented and repeatable methodology was also developed to fulfil the study aims. Following the methodology developed in this study, conclusions may be divided into those related to the methodology used and those related to the issues themselves. In evolving the methodology, this research has found that the actual step-by-step processes for generating a relevant set of major IS issues from diverse survey responses has not been adequately reported. The data reported is non-numeric, generally unstructured, and often particularly rich in various perceptions. The three-round, Delphi-type, open survey, together with a series of interviews and domain experts’ workshops have served as a guide to better understand and facil-
iterate the comparison of such study evidence. The methodology has proved to be an alternative approach for coping with this type of study in the context of key IS issues. Following the administration of qualitative and quantitative data collection and analysis (the processes of identifying, rationalising, determining and comparing issues), a final set of ten major issue categories with thirty-eight related sub-issue categories was obtained. A detailed discussion of these issues was presented. Although the findings in some discussions may apply only to the situation at the time of the study, the insights from the study findings should interest and benefit the ERP lifecycle implementation, management and support stakeholder groups.

All stakeholder groups in ERP lifecycle-wide implementation, management and support are beneficiaries of a better understanding of these issues. ERP software vendors seek to redress negative perceptions that ERP implementation duration and costs are difficult to manage and improve ongoing customer support and satisfaction. Consulting firms seek to streamline implementation and share in the savings with clients. Both software vendors and consultants seek to increase the size of the ERP market through reduced costs and increased benefits to clients. Furthermore, software vendors and their implementation partners need to be more attuned to the issues identified to become better able to further support clients throughout the ERP lifecycle. The benefits to clients from identifying and analysing ERP lifecycle management related issues include rationalized and more effective support from both the software vendor and implementation partner, improved ability to react to a changing environment, reduced costs and ERP systems that more accurately reflect business needs.

Additionally, if the members of the information systems management community (e.g. professional societies, educators, trainers, researchers) are to serve the community effectively, they must be aware of the key issues of ERP lifecycle management and support in organisations. Professional societies serve the information systems management community by arranging conferences, sponsoring guest lectures, and disseminating information through their publications. Educators and trainers need information on key concerns so that they may help graduates develop the necessary skills to solve these issues. Researchers will be more successful in attracting sponsorship if they undertake studies that are closely aligned with the concerns of the marketplace.

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References


Major Issues with Enterprise Systems


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