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Understanding the Impact of Enterprise Systems on Management Decision Making: An Agenda for Future Research

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Abstract: Enterprise systems have been widely sold on the basis that they reduce costs through process efficiency and enhance decision making by providing accurate and timely enterprise wide information. Although research shows that operational efficiencies can be achieved, ERP systems are notoriously poor at delivering management information in a form that would support effective decision-making. Research suggests managers are not helped in their decision-making abilities simply by increasing the flow of information. This paper calls for a new approach to researching the impact of ERP implementations on global organizations by examining decision making processes at 3 levels in the organisation (corporate, core implementation team and local site).

Keywords: ERP, decision-making, organisation, MIS

1. Introduction

An Enterprise Resource Planning (ERP) system can be considered as being composed of a basic transactional system, which dictates to users how to process business transactions, and a management control system, which facilitates the planning and communication of business targets and goals.

Sammon et al. (2003) describes these 2 components of ERP systems as the solution to "operational" integration problems and "informational" requirements of managers. These are the same concepts expressed by Zuboff (1988) in describing the use of technology not only to automate manual tasks, but also to "informate" management tasks, such that "events, objects and processes become visible, knowable and shareable in a new way".

ERP systems are therefore expected to deliver the following benefits: (1) reduce costs by improving efficiencies through computerization; and (2) enhance decision-making by providing accurate and timely enterprise-wide information (Poston and Grabski, 2001).

Whether these centralized information systems really are capable of delivering both types of benefit has been a topic of debate for some time. "The notion that a company can and ought to have an expert (or a group of experts) create for it a single, completely integrated supersystem – an MIS – to help it govern every aspect of its activity is absurd", according to Dearden (1972).

The Gorry & Scott Morton framework (1971a), which focused on understanding the evolution of MIS activities within organizations, criticized the "total systems approach", maintaining that the integrated company-wide database is a misleading notion and would be exorbitantly expensive.

We now know that not only is it possible to build such systems, but that they are exorbitantly expensive. This has not prevented 40% of companies in the USA with revenues greater than $1 billion implementing ERP systems (Stefanou, 2001). The total market for ERP software has been estimated at $1 trillion by the year 2010 (Bingi et al. 1999).

Despite this strong push to implement ERP among today's business organizations, there is a lack of understanding of the real post-implementation benefits of these integrated systems, and more insidiously, little awareness among adopters of the longer-term organizational impacts (positive or negative) that may ensue.

Much of today's research in the area of organisational learning and knowledge management deals with the difficulties of creating and harnessing the value inherent in employees know-how and ways of doing business. This begs the question as to why so many companies are willing to throw out what they have learned in favour of practices they know nothing about. And, when they do so, what evidence is there to suggest that companies do achieve their stated aims of improved efficiency by adopting these industry best practices?

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Gorry (1971) found that managers can use models to help them understand the environment they are operating in, and that this should be considered an "educative" process, rather than being related to the ability to improve specific decisions. He does argue, however, that managers often possess the knowledge and experience vital to "parameterising" business models without necessarily understanding the dynamics of the model itself.

Of course one of the aspects of employing what vendors call "best practice" is that all transactions must fit in the same system model, regardless of the relative importance of the transactions. The implementation dictates that this is an "all or nothing" scenario, where all purchases and revenue transactions must be entered into the system, successfully ignores the 80:20 rule as elaborated by Orlicky (1975), in what is probably the definitive book on MRP, according to Browne, Harhen & Shivnan (1996). If 20% of the components account for 80% of the cost, why apply the same rigour to recording transactional movements of inventory across 100% of components? Thus, the extreme standardisation of business process inherent in ERP systems creates huge volumes of data without providing a clue for how to exploit it and may therefore not beneficial from a decision-making point of view.

In this paper, decision-making theory and models are reviewed, focusing on how an ERP implementation might impact on these constructs. The next section of the literature review looks at how IS systems have striven to satisfy both operational and informational requirements in the past. This is followed by a summary of the existing research on the impact of ERP systems, which concludes by confirming that much research has been focused in the past on implementation, but that there has been much less work done on the post-implementation impact on the organisation of these systems.

Having established in the literature review that centralisation of decision making in an organisation may have an impact on performance at a local level, the role of information systems (and particularly ERP) in compounding this de-responsibilisation of local employees is explored.

Finally, a number of key questions for research in enterprise integration are asked, and the paper concludes with some initial findings from the field study.

2. Literature review

2.1 Decision making models

Much research in decision making during the last century was focused on the difficulty of defining a rational model for an ever-changing process that also allows for the irrational or contextual factors that make up the myriad decisions made by management in organisations. Most of the literature can be positioned along a continuum between two poles, with the cerebral rationality of Simon's sequential theories (bounded rationality) at one end and the anarchical processes of the garbage can model at the other (Langley et al. 1995).

In Simon's (1972) theory for decision-making, he posits that no business could process satisfactorily all the "zillion things" affecting the marketing of a product, in the hope that the right answer for maximising profit would pop out at the end. That was classical economic theory, he said, but it was "a ridiculous view of what goes on". Rather, a business tried to make a decision that was "good enough". He called his theory "bounded rationality" and invented a name to describe it: "satisficing", a composition of the words satisfy and suffice.

Much of the debate surrounds whether management decisions can be structured into distinct phases (eg. intelligence, design and choice from Simon, 1977), or whether the complexity of factors influencing an individual decision will mean that there can be no pre-determined outcome.

When these questions are considered in the context of an ERP implementation, we can anticipate that there may be impacts at all levels in the decision domain:

- The actors concerned may have changed as roles and responsibilities may be re-assigned to adapt to the new template processes. At a minimum, their contribution may have changed towards less autonomy and less control.
- The decision process may have changed in that there will be new or modified sources of information and / or different steps to the process
- The decision itself may change as the system may have incorporated some of the conditions and exception traps which were previously dealt with manually. This

may be perceived as less freedom or additional constraints by the decision maker.

The question of whether a decision is subject to programming is a key concept of organisational learning. Following the implementation of an ERP system, information that was tracked manually or not at all will now have to be recorded unambiguously in the system in order for automatic triggers to be activated allowing transactions to move on to the next stage in the process.

Langley (1995) identifies 3 aspects of decision-making which render it a difficult subject for empirical research:

- Many decisions do not imply distinct identifiable choices, and are difficult to pin down, in time or in place
- Decision making processes do not necessarily proceed as a linear sequence of steps, rather they are driven by the emotion, imagination and memories of the decision makers, punctuated by sudden crystallisations of thought
- It is difficult to isolate decision processes, as decisions typically become intertwined with other decisions.

Gorry (1971) explores the relationship that managers have with information and how models are one way of reducing complexity to understandable dimensions. His argument is that the expansion of information systems into higher management functions has resulted in an exaggerated focus on information quality, at the expense of an emphasis on decision making models and their components – ie: constraints, goals and other parameters.

Interestingly, the implementation of an ERP system will only serve to exacerbate this lack of managerial models for decision-making. Firstly, each ERP package uses operational models as underlying frameworks and these models can differ in terms of how they operate. Both Oracle and SAP are based on the principle of "work orders", for example, which correspond to unique production jobs which consume inventory as they progress. However the manner in which they tie back to sales orders is different from one package to the other. Understanding and being able to communicate this new process blueprint and how it differs from the old way of working is a huge challenge for managers going through an ERP implementation.

Secondly, managers may not initially understand the reasoning behind some of the configuration options embodied in the business template as implemented by the ERP project team. Only a select number of project team members are privy to the logic behind the configuration decisions that are made during the implementation stage, and furthermore, once implemented, users will usually be dissuaded from any course of action which implies changes to these decisions. The effect of this will be to create a "fuzziness" around the meaning of some pieces of information, thereby reducing the scope of a managers decision domain.

Thirdly, there is a wealth of information important for decision-making, which lies outside the traditional ERP boundaries (Stefanou, 2001). For example, information from external sources, such as published statistics, market data, and experts' opinions are not easily accommodated within the ERP environment. Legacy systems may contain years of historic data that can be crucial in determining trends and patterns.

Managers require decision-making models to help them decipher the complexity of the real world. ERP systems, while providing solid transactional engines at Anthony's (1965) operational control level, tend to increase the volume of information available to managers, but in so doing, add even greater complexity to decision making at the management control level.

Furthermore, because the refrain of ERP vendors is liberally sprinkled with the notions of "best practice" and "zero modifications", the perception is that the processes embedded in these systems is not up for question by individual managers. Equally the tight timescales for their implementation allows little margin for questioning the corporate template being rolled out. Hence managers are expected to take on models that are not their own, with parameters they had little influence on, and deal with the corresponding increase in information volume.

Little's (1970) observations would seem to bear this out:

> *"People tend to reject what they don't understand. The manager carries responsibility for outcomes. We should not be surprised that he prefers simple analysis that he can grasp, even though it may have a qualitative structure, broad assumptions, and only a little relevant data, to a*

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> *complex model whose assumptions may be partially hidden or couched in jargon and whose parameters may be the result of obscure statistical manipulation."*

Pfeffer (1992) discusses the selective use of information in management to rationalise decision processes, and how, under conditions of uncertainty, individuals would prefer to use data and decision-making processes "with which they are comfortable".

However, from the broader perspective of the organisation, rather than the individual, integrating mechanisms are adopted which increase its information processing capabilities (Galbraith, 1974). ERP systems could be considered mechanisms of integration, in Galbraith's parlance, allowing routine and predictable tasks to be automated. This would equate with Winter's (1985) notion of routinised or high volume mechanistic decision making, which implies the use of some sort of system.

Gorry & Scott Morton (1971) excluded a certain category of straightforward "information handling" activities from their MIS framework, arguing that despite the structured nature of these activities, there were no decisions involved. Winter (1985) suggests that there is conscious choice in the selection of which matters to treat mechanistically, and which deserve to be treated with some deliberation. Suppressing the genuine choices about some matters may be the only way to make genuine choices available in other matters.

The choices inherent in implementing and configuring ERP processes do, in effect, eliminate or suppress the choices to be made by process users (employees), thereby reducing the onus on employees to make decisions for day to day routine work. Taking procurement as an example, if Purchase Order approval levels are parameterised within an ERP such that certain PO's with amounts that fall within acceptable limits can be approved automatically (ie. don't require manager sign-off), as long as they are from a recognised list of items from an agreed set of corporate suppliers (the only ones available in the system), then the decision making has been reduced to a mechanistic level. This will improve the efficiency of the procurement process by allowing faster PO approval for those "standard" items, and should yield monetary benefits as well, in terms of volume discounts from suppliers.

Winter (1985) warns however, the wider the range of situations subsumed by the routines and the better the routinised performance, the fewer reminders there are that something outside routinised competence might be useful or even essential to survival. This can lead to "irresponsible or slothful" inattention, whose consequences are "made to seem tolerable". Furthermore, if the routines are perfect, being alert to their limitations is wasteful.

Earl & Hopwood (1980) refer to the tendency in the MIS area to perceive uncertainty as "threatening rather than inevitable", and, rather than exploiting information for its "educative" (Gorry, 1971) potential, information systems professionals tend to design models that mask reality with "assumed certainties".

In the next section of the literature review, how information systems have striven to satisfy both operational and informational requirements in the past is reviewed.

2.2 Using information systems to satisfy managerial requirements

Since the early days of data processing, designers of information systems have been striving to satisfy the requirements of both operational and managerial users. Much debate has centered around the ability of integrated information systems to satisfy both the operational requirements for managing basic resources and the managerial requirements for planning and control of these activities.

Anthony (1965) developed a taxonomy of managerial activity to help to differentiate the types of support possible from information systems. Allowing that the boundaries between these categories are not clear, he defined managerial activity as consisting of:

- strategic planning (setting objectives, assigning resources, policies)
- management control (ensure resources used effectively and efficiently)
- operational control (ensuring specific tasks are carried out effectively and efficiently)

Gorry & Scott Morton (1971) describe the characteristics of the information required by these 3 categories of activity as significantly different. Operational control activities require information that is detailed, real-time and based on the actual use of internal resources. Managerial control, on the other hand, requires more summary information, not necessarily

real-time and includes external sources of information.

The framework for management information systems proposed by Gorry & Scott Morton (1971) is very applicable to today's situation, over 30 years later, where the promise of ERP systems has been clearly to support all types of management activity. Although it is tempting to believe that improved management control should stem from mastery of the detail contained in operational systems (and certainly the language used by ERP vendors would encourage this perception), Gorry & Scott Morton (1971) would argue that these are 2 distinct levels of activity, with different information characteristics and therefore requirements. The databases to support management and strategic decisions would be quite different to those used in operational control.

It is interesting to note, in passing, the support for these categories of activity afforded by ERP systems. Questions of operational control are addressed by "hardwiring" the execution and monitoring of specific tasks into standard processes. Assisting managers with their management control duties, however, is not necessarily addressed, and this for the simple reason that employees are assigned to data entry "roles" that are pre-ordained by the ERP software, regardless of the number of people available to fill those roles. Standard reporting is not geared towards the monitoring of the "efficient" or "effective" use of people.

Ackoff (1967) suggests that most managers have some conception of at least the some of the types of decisions they must make. Their conceptions, however are likely to be deficient in a very critical way: the less a phenomenon is understood, the more variables are required to explain it. It was Ackoff's contention, well before the age of global ERP systems, that most managers suffer not from a lack of relevant information, but rather from an over-abundance of irrelevant information. Gorry (1971) decries the tendency to assume that improved decisions will result from increasing the information provided. This warning was echoed by Benjamin and Blunt (1992), suggesting that "managers and workers are in danger of dying from a surfeit of communication".

The emphasis in information systems design has therefore shifted towards systems that provide managers with the information they require in a broader sense rather than just one specific decision and also that support their communication needs. Executive Information Systems (EIS) and Executive Support Systems (ESS) have been put forward as the solution to the problems of information provision to senior managers. On the basis of a few famous examples (exceptions at the time), Rockart and Treacy (1982) have claimed that ESS (a term they first coined in 1982) was going to allow a revolution in executives' use of computers.

2.3 Existing research on impact of ERP implementations

ERP software is a semi-finished product with tables and parameters that user organisations and their implementation partners configure to their business needs (Shang & Seddon, 2000). It is the complete set of configuration options (often called the template) selected by the customer implementing the software that defines how a system will work.

In order to provide a framework for the review existing research in the area of impact on the organisation, 3 separate models of ERP project phasing were considered: Bancroft et al (1998), Ross model (1998), and Markus et al. (1999).

These 3 models can be compared in terms of their nomenclature (see Figure 1).

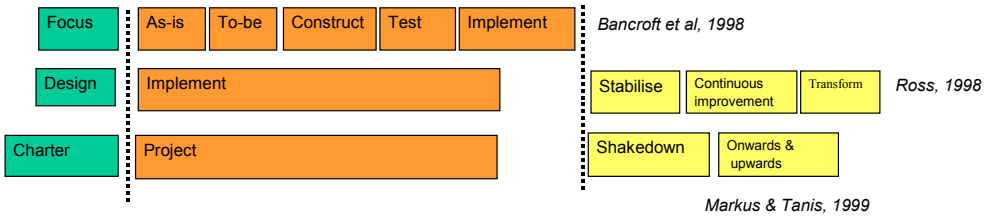


Figure 1: Comparison of the different project phase definitions

In a study of academic activity related to ERP systems, Esteves & Pastor (2001) scanned 180 ERP related articles in key IS journals and conferences during the period 1997-2000 and found that almost 79% of research work was in the ERP project lifecycle. 43% of all the

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research focused on the implementation phase, and this in the form of case work.

Figure 2 shows this breakdown in graphic format (according to the Markus & Tanis nomenclature):

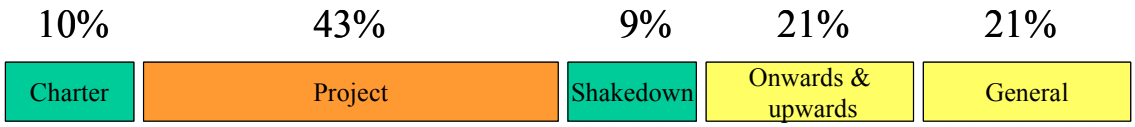


Figure 2: Breakdown of ERP research into project phases (adapted from Esteves & Pastor, 2001)

Among the 9% of articles researched carried out on post-implementation issues ("Shakedown" in Figure 2), benefits, limitations and factors that affect ERP usage are the main topics. Some studies analyse the impact of ERP systems in particular functions (eg. management accounting). It is suggested that topics for further research should include ERP impact on organisations at all levels (technological, organisational, and business).

Shang & Seddon (200) classify the types of managerial benefit that can be achieved (gained from review of IT value literature since 1970). Based on data from 233 published ERP-vendor success stories, the authors found that every business achieved benefits in at least 2 dimensions:

- Operational benefits (quoted in 73% of cases)
- Managerial benefits
- Strategic benefits
- IT infrastructure benefits (quoted in 83% of cases)
- Organisational benefits

The 21% of articles in the "Onwards & upwards" phase consist of work carried out in the Evolution and Education phases. Authors in the Evolution phase have been focusing mainly on the analysis of new emerging ERP technologies and business models (web, data frameworks, workflow, knowledge handling, application integration,). Education research includes the analysis of IS curricula with respect to ERP and the adoption of ERP in Universities.

The 21% of articles that were non-lifecycle related ("General" in Figure 2) consisted of the following subjects :

- Research issues (benefits, value, …)
- Organisational knowledge (skills, culture,…)
- Business modelling (tools, OO-approach,)
- ERP development issues (interfaces, architecture, …)

There is relatively little research on the area of organizational impact of ERP systems. Few studies have looked at the post implementation period of ERP systems to determine how and why business benefits evolve over time (Staehr et al, 2004).

The last section of this paper outlines the key questions for further research in this area.

2.4 Key questions for researchers on enterprise integration

Management decision making can be said to be made up of a combination of structured information "handling", and the application of knowledge based on information and experience that is unstructured. The application of highly integrated systems such as ERP to business activities is further evidence of the "evolutionary nature of the line separating structured from unstructured decisions" (Gorry & Scott Morton, 1971).

Research on ERP experience in industry suggests that the single most important factor in their successful implementation is the organisation itself, that is, the readiness of employees to embrace change. This is comprehensible, given that the alignment of resources to the new ERP enshrined business processes means that roles, responsibilities and therefore job descriptions will be impacted at the operational level.

However, it is our contention that there has been little research on the effects of these changes at the managerial level, whose job it is to ensure that "resources are obtained and used effectively and efficiently in the accomplishment of the organisations objectives" (Anthony, 1965).

Researchers should strive to understand the longer-term effects of the impact of ERP systems on management decision-making. In evaluating the impact, the critical criteria will be the standardisation of processes and the centralisation of responsibility for decision-making.

Pounds (1969) stated that managers had difficulty being explicit about the process by

which their problems are selected. Does the increased standardisation of business processes inherent in ERP implementations help managers to identify the problems to treat, prioritise those problems and assign scarce resources to them? In theory, time that might have been spent designing more efficient procedures can now be spent on more analytical tasks. Further research is required to establish to what extent they are equipped to deal with this more "tactical" work.

Furthermore, as responsibility for decision-making tends to be more centralised in the post-ERP world, managers may find themselves with a perception of having less control over their decision domains, and with less autonomy to take new or different approaches to the resolution of issues.

Fundamental research questions are the following

- What models are used in the post-ERP organisation to identify and prioritise the problems which managers focus on?
- To what extent does the ERP system provide the information required by managers to make decisions?
- Has the standardising and centralising effect of ERP systems helped managers in their goal of ensuring the effective and efficient use of resources?

ERP projects in research literature have been treated like large IS projects, using many of the analytical tools from traditional information systems research. Our approach to research in this area is to acknowledge that the biggest impact to the company has been on people and their jobs, and that these effects are better defined in terms of organizational change. Using constructs adapted from the study of organisations rather than the study of information systems will give researchers the lens to view ERP implementation impacts in the context of the bigger picture of organizational driving forces.

References

Adam, F. and Doyle, E. (2001) Enterprise Resource Planning at Topps International Ltd, a case study in Exploring Corporate Strategy, Johnson & Scholes, 6th edition, Prentice Hall

Anthony, R. (1965) Planning and Control Systems: A Framework for Analysis, Boston, Harvard University Graduate School of Business Administration

Bancroft, N.H., Seip, H. & Sprengel, A. (1998). Implementing SAP R/3: How to Introduce a Large System into a Large Organization, Manning, Greenwich, CT.

Benjamin, R.I. and Blunt, J. (1992), Critical IT issues: the next ten years, Sloan Management Review, Summer, 7-19.

Besson, P. (1999) Les ERP a l'epreuve de l'organisation, Systemes d'Information et de Management, No. 4, Vol 4.

Bingi, P., Sharma, M. and Godla, J. (1999) Critical Issues Affecting an ERP Implementation, Information Systems Management, Summer, 7-14.

Browne, J., Harhen J., Shivnan, J., (1996) "Production Management Systems", Addison-Wesley, pp. 96

Brunsson, N. (1989) *The Organisation of Hypocrisy*, John Wiley & Sons, England.

Davenport , T.H. (1998) Putting the Enterprise into the Enterprise System, Harvard Business Review, Jul-Aug

Davenport, T.H. (2000) Mission critical – realizing the promise of enterprise systems. Boston (MA): Harvard Business School Press, 2000

Dearden, J. (1972) MIS is a mirage, Harvard Business Review, Jan/Feb, Vol. 50 Issue 1, p90

Esteves, J. and Pastor, J. (2001) Enterprise Resource Planning Systems Research: an Annotated Bibliogrpahy, Communications of AIS, Vol. 7, No. 8, August

Gorry, G. and Scott Morton, M. (1971) A Framework for Management Information Systems, Sloan Management Review, Fall, pp 55-70

Gorry, G. (1971) The Development of Managerial Models, Sloan Management Review, Winter, pp 1-16

Holland, CP, Light, B and Gibson, N, 1999, A Critical Success Factors Model for Enterprise Resource Planning Implementation, Proceedings of the 7th European Conference on Information Systems, Copenhagen Business School, pp 273-287.

Inmon, W.H. (1999) Data Warehousing and ERP http://www.billinmon.com/library 24/11/2001

Jensen M.C., Meckling W.H. (1992), Specific and general knowledge, and organisational structure, in Werin L., Wijkander, H. (eds) Main currents in contract economics, Cambridge, MA, Blackwell Publishers, pp 251-91

Kalatoka R. and Robinson, M. (1999), E-business – Roadmap to success, Addison Wesley, Reading, MA.

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Krumbholz, M, Galliers, J. et al. (2000) Implementing enterprise resource planning packages in different corporate and national cultures, Journal if Information Technology, Vol 15, No.4, December, pp 267-279

Little J. (1970) Models and Managers: The Concept of a Decision Calculus", Management Science, Vol. 16, No. 6, April, pp B466-B485

Lederer A.L. and Mendelow A.L. (1987) Information resource planning: overcoming difficulties in identifying top management's objectives, MIS Quarterly, Vol 11, No. 3, pp 389-399

Markus, M.L. and Tanis, C. (1999), "The Enterprise Systems Experience – from Adoption to Success", Working paper, Claremont Graduate University.

Miller, J.G., Sprague L.G. (1975, Sept-Oct) Behind the Growth in Materials Requirements Planning, *Harvard Business Review*, pp 84-89

Mokyr, J. (2001, December). The rise and fall of the factory system: Technology, firms and households since the Industrial Revolution, *Carnegie Rochester Conference Series on Public Policy, 55* (1), 1-45.

MPIT (1984), Management Productivity and Information Technology, Overview report, Strategic Planning Institute

Muller, A. (1992) L'informatique dans l'entreprise, Presses Universitaires de France, "Que sais-je" series no. 2665

O'Gorman, 2004. The Enterprise Resource Planning Era: Lessons Learned and Issues for the Future, *Idea Publishing Group*

Orlicky J. (1975) Materials Requirements Planning : The New Way of Life in Production and Inventory Management, New York, McGraw Hill

Orlikowski, W. and Robey, D. (1991), Information Technology and the structuring of organisations, Information Systems Research, 2, 143-169.

Patton, M. (1990) Qualitative Evaluation and Research Methods, Newbury Park : Sage Publications

Pfeffer , Jeffrey (1992) Managing with Power, Politics an Influence in Organisations, Harvard Business School Press, Boston, MA

Poston, R. and Grabski, S., (2001) Financial impacts of enterprise resource planning implementations, International Journal of Accounting Information Systems, December, pp 271-294.

Pounds, W. (1969) The Process of Problem Finding, Industrial Management Review, Fall, Vol. 11 Issue 1, pp. 1-19

Radding, A. (2000) Knowledge Management appears on ERP radar, Datamation, http://itmanagement.earthweb.com 18/10/2001

Rockart, J. and Treacy, M. (1982) The CEO goes on-line, Harvard Business Review, Jan/Feb, Vol. 60 Issue 1, p82

Ross, J.W. and Vitale M.R. (1998), The ERP Revolution: Surviving versus Thriving, Information Systems Frontiers, Vol 2. No. 2

Sammon, D., Adam, F. and Carton, F. (2003), "The Realities of Benefit Realisation in the Monolithic Enterprise Systems Era- Considerations for the Future", in Proceedings of the 10th European Conference on Information Technology Evaluation, Madrid, Spain, September 25th-26th.

Sammon, D., Adam, F. and Carton, F. (2004), Understanding the ERP post-implementation discourse, in proceedings of the 6th International Conference on Enterprise Information Systems, April, Porto, Portugal

Simon, H. (1972) Theories of Bounded Rationality, in Decision and Organisation, C.B. McGuire & Radner (Eds), North Holland, Amsterdam, 161-148

Simon, H. (1977) The new Science of Management Decision, (3rd ed), Prentice Hall, Englewood Cliffs, NJ.

Staehr, L. Shanks, G. and Seddon, P. (2004), Understanding the Business Consequences of ERP Systems , in Adam and Sammon (Eds) The Enterprise Resource Planning Decade: Lessons Learned And Issues For The Future, IPG, Hershey: PA.

Stefanou, C.J. (2001) Organisational Key Success Factors for Implementing SCM / ERP Systems to Support Decision Making, Journal of Decision Systems, Volume 10, No. 1/2001 pp49-64

Sullivan, C.H. (1986), An evolutionary new logic redefines strategic systems planning, Information Strategy: The Executive's Journal

Zuboff, S. (1988), In the Age of the Smart Machine: The Future of Work and Power, Heinemann Professional Publishing, Oxford