

## Association for Information Systems AIS Electronic Library (AISeL)

---

AMCIS 2000 Proceedings

Americas Conference on Information Systems  
(AMCIS)

---

2000

# Decision Making in the Evaluation, Selection and Implementation of ERP Systems

Maha Shakir

Massey University, [m.shakir@massey.ac.nz](mailto:m.shakir@massey.ac.nz)

Follow this and additional works at: <http://aisel.aisnet.org/amcis2000>

---

### Recommended Citation

Shakir, Maha, "Decision Making in the Evaluation, Selection and Implementation of ERP Systems" (2000). *AMCIS 2000 Proceedings*. 93.

<http://aisel.aisnet.org/amcis2000/93>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2000 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# Decision Making in the Evaluation, Selection and Implementation of ERP Systems

Maha Shakir, Institute of Information and Mathematical Sciences,  
Massey University, Albany Campus, Auckland, New Zealand, [m.shakir@massey.ac.nz](mailto:m.shakir@massey.ac.nz)

## Abstract

The evaluation, selection and implementation (ESI) of ERP systems involve making multiple decisions during the lifecycle of the ERP project. This study tries to map six models of decision-making to the ERP project lifecycle, which is conceptualized using case study data for a health service provider organization in New Zealand. ERP projects are deemed strategic projects for which success or failure has a great impact on the organization. Gaining an understanding of the decision-making process during the life of the project helps in better preparations and planning before and during each phase. Findings suggest that some decision-making models apply to the stages of evaluation, selection and implementation while others are missing. The three models that apply are the administrative, adaptive and political models. This study aids practitioners in better planning and implementation of ERP projects through better understanding the decision-making process. A benefit to academics is in providing new insights for ERP systems implementation, an area where little research is conducted.

## Key words

ERP, decision-making models, selection, evaluation and implementation.

## Introduction

Enterprise resource planning (ERP) systems are software packages that integrate information across the entire organization. This integration removes inconsistencies and enables the organization in attaining consolidated reports. ERP projects are expensive and time consuming. Costs exceed US\$100,000 and the timeframe for evaluation, selection and implementation of an ERP system is between six months and two years.

Despite the fact that ERP is considered a large capital investment for an organization, the decision to choose one is not purely financial (Ballantine et al, 1999). From project initiations to the post implementation review, multiple decisions are made by different stakeholders. This study tries to apply different models of decision making to the different phases of the ERP implementation project, which helps in bringing insight in an area where academic research is scarce (Gable et al., 1997 & Gibson

et al., 1999). It is also of help to practitioners, who can through gaining better understanding of the decision-making process, better plan and implement the ERP project.

The next section will look at what ERP systems are and how they are different from other application software. The decision-making models are then presented. Next, the health service provider case study is discussed followed by a brief description of the ERP project. Mapping decision-making models to the different phases of the ERP project follows. Discussion also includes the applicability and limitations of reviewed decision-making models to ERP projects. Finally, as part of the conclusion section, we discuss the contribution of the study and the area where future research is suggested.

## Enterprise resource planning systems

ERPs are application software that integrate information across the entire organization. This integration removes inconsistencies and enables the organization in attaining their consolidated reports. The origins of ERPs are the MRPs systems (Chung et al., 1999). The MRP families were focused mainly on manufacturing operations while the ERPs support the integration of other functions like sales, marketing, human resources and others. ERPs are evolving to support other functionalities that were offered separately such as supply chain management (SCM), customer relationship management (CRM), professional service automation (PSA) and others.

The market for ERP is growing rapidly at an annual growth rate of 32% with an expected annual revenue of US\$66.6 Billion by 2003 (Carlino et al., 1999). Despite the fact the high-end of ERP market is saturated because the year 2000 problems are thought to be resolved by now, but future growth is predicted and electronic commerce is its new driving force for the future (Janzen, 1999). The ERP product models the standards of best practice. And because its integrated modules span across the different functions of the organization, business processes are likely to be adjusted in order to fit the ERP product. For that reason, decisions during the different phases of the project are not purely financial as expected of large a capital investment project (Ballantine et al, 1999). Considerations of business strategy, business processes and the different stakeholders involved influence these decisions.

## Decision making models

A recent study, which surveyed 42 ERP implementation projects, has found decision making as one of the critical success factors identified (Parr et. al., 1999). Future research is suggested to refine the factors through conducting in depth case studies to explore the

relationship between the factors and the contextual and process issues which is what this study partly aims at (Parr et. al., 1999 and Koh et. al., 2000). Table 1 summarizes the six decision-making models (Hoy et al., 1995) and describes the assumptions and the decision-making process for each. A brief review of each model follows.

**Table 1: Six decision-making models, Adapted from Hoy et al., 1995**

Model	Description	process
<b>1. The classical model:</b>	Decision-makers seek the best alternative to maximize goal achievements.	The process is a series of sequential steps, which are: 1. Identify the problem 2. Diagnose 3. Develop alternatives 4. Consider consequences 5. Evaluate 6. Select best alternative 7. Implement and evaluate
<b>2. The administrative model</b> (Herbert Simon, 1947):	Decision-makers look at alternatives that meet minimum standards.	Satisfying solutions are good enough solutions that are reached by narrowing the range of alternatives. The decision making process is cyclic and learning is part of it.
<b>3. The incremental model</b> (Charles Lindholm, 1959, 1965):	Decision-makers make small incremental changes by making successive limited comparisons starting from the present situation with no set of clear objectives.	Successive comparison is thought to be an alternative to using theory, which guides the decision making process for both the classical and the administrative models.
<b>4. The adaptive model</b> (Amitai Etzioni, 1967, 1986, and 1989):	The model is a mix of the administrative and incremental models.	Incremental decisions are made within a framework for existing mission and policy.
<b>5. The Irrational model</b> (March, 1982), (Cohen, March and Olsen, 1972):	A decision does not begin with a problem and end with a solution. Decisions are a product of organizational events.	The decision making process relies on chance rather than rationality. Decision-makers scan for matches among solutions, problems and participants. A decision is not made until a problem matches an existing solution.
<b>6. The Political model</b>	The model is one in which politics replace organizational goals.	The decision making process is influenced by decision-makers.

The classical model is based on economic theory where the decision-maker seeks the best alternative to maximize goal achievements. The implementation of this model requires identifying all alternatives and evaluating each which is an exhausting process that is more applicable in a scientific, easy to measure and control setting as opposed to a business environment. The administrative model solves the practicality problem of the classical model. It is based on the assumptions that people are of bounded rationality. This means that their limited knowledge, abilities or capabilities leads them to look at alternatives that meet minimum standards.

The incremental model is used for complex and uncertain problems. Decision-makers make small incremental changes by making successive limited comparisons starting from the present situation. It is thought that when a situation becomes complex decision-makers are likely to make more progress by comparing practical alternatives rather than by following abstract theoretical analysis. The adaptive model is a mix of the administrative and incremental models. Objectives are set beforehand but the decision-making is incremental. Its strength comes from the combination of the rationality of the administrative model with the flexibility of the incremental model.

For the irrational model, a decision does not begin with a problem and end with a solution. Decisions are a

product of organizational events. This model is thought to appear in the context of high uncertainty. The political model is one in which politics replace organizational goals. Objectives are personal rather than organizational. It is the balance of power within the organization that influence decision-making. It is acknowledged that two recent studies of ERP implementations have included the political dimension as one of the elements of the theoretical framework developed (Caldas et. al., 1999 & Markus et. al., 2000).

The next two sections will present case study details describing the organization and the different phases of the ERP project, respectively. The decision-making models reviewed will then be mapped to decisions during the lifecycle of the ERP project. A discussion of the applicability and limitation of each model for ERP projects then follows.

## The Health Service Provider (HSP) organization

HSP Ltd. is a crown health enterprise established in 1993. The company provides hospital-based services, community-based and domiciliary services. In addition, HSP operates a regional alcohol and drugs service, a regional forensic psychiatric service and a home for physically disabled children and teenagers.

The organization has a board of directors appointed by the minister for crown health enterprises. The board is non-executive and part-time. The principal officer is the chief executive officer (CEO) who reports to the board. The company is organized into several service units, each of which has a service manager who reports to the CEO. They are the medical services, surgical and clinical support services, older people services, women's health services, mental health services, disability support and community health services and regional alcohol and drugs service.

In addition, the finance and business support services, business development services and communications are support services, each headed by a manager who reports to the CEO. Within most of the services listed there are a number of responsibility centers (e.g. wards or departments) each with a manager who reports to the Service Manager.

HSP maintains three broad categories of records and files. They are the medical records (written case-notes, lab reports, x-ray reports etc.), personnel records, administrative records and financial records; each in hard copies and computer files. The systems that were considered for the ERP project included the personnel, administrative and financial records systems only.

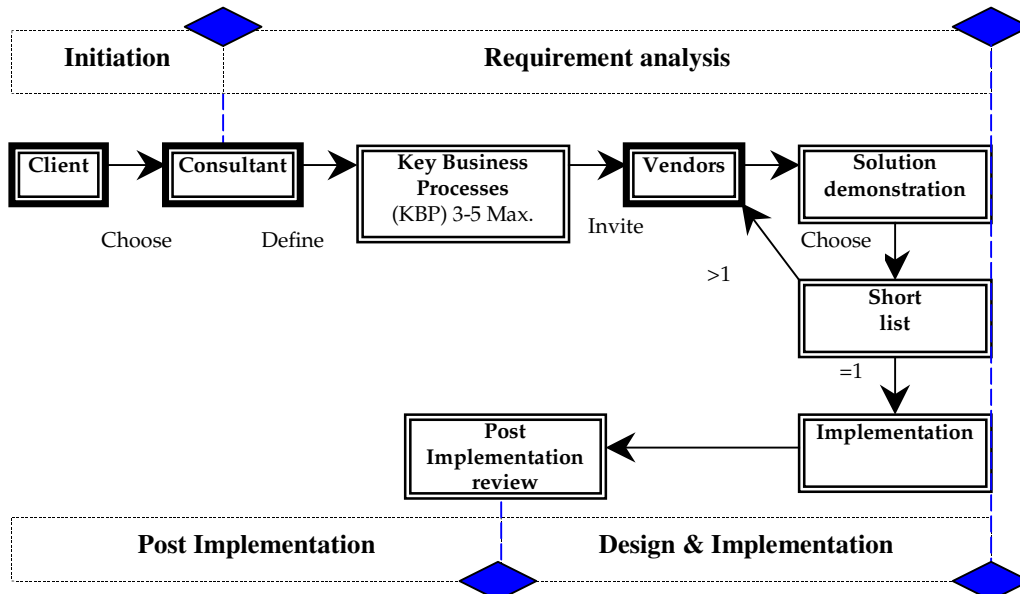
## The ERP project for HSP

Although information integration was one of the important considerations in investing in the ERP project, the main initiative was solving the Y2K problem. The purchasing and the human resources applications were not Y2K compliant and that triggered the project start.

The ERP project for HSP needs to be looked at from the evaluation, selection and implementation (ESI) perspective. The different stages of the ERP project are explored in detail. Figure 1 illustrates the different phases of the project and critical decision points within the project lifecycle. Senior management sought the services of a management consultant (a big five organization) which HSP had a previous working relationship with. Management agreed to consider ERP systems as opposed to other types of application software on the basis of the consultant advice. The main reason behind that decision was minimizing the risks of an incomplete project within the limited time to the start of the millennium (approximately two years, by then).

A selection committee was formed. The consultant headed the selection committee as a project manager with unit managers representing finance, personnel and procurement. The CEO was included as well to the role of the project sponsor. Other personnel in support roles were sometimes invited for clarification and advice.

Figure 1: The ESI framework for the ERP project



The project manager provided the selection team members with research studies of ERP systems, which included the capabilities of each, cost benefit analysis and reference to other organizations that have implemented similar systems. Other health organizations within NZ were then consulted about their experience.

The selection committee initially short-listed four vendors on the basis of studying the research reports. These were SAP, Oracle, PeopleSoft and JDEdwards. All are recognized to be 1st tier ERP vendors. Each vendor was asked to provide information and gave a presentation. After that stage SAP was excluded. Committee members felt that SAP was expensive, the cost of implementation was high, and data entry is enormous which makes maintenance a difficult task. Moreover, no human resources (HR) system was offered by SAP at that time.

The remaining systems that were short-listed were then explored in detail. The selection committee had been expanded to include other people (besides the five original members mentioned earlier). These included a nurse executive, the woman's health manager and personnel from HR, payroll, asset management, accounts payable, accounts receivable, IT and other functions to a total of approximately twenty people.

The selection committee then went to vendors with a script describing the business case for each function and asked them to demonstrate their application. This was followed by the selection team visiting each vendor at their premises where new detailed presentations were given. Each visit to each vendor took approximately two working days. After each presentation a questionnaire sheet (supplied by the project manager) was handed to committee members to fill out their perceptions. The questionnaire was structured into items such the presentation style, the level of comfort with the people giving the presentation, how well they managed to meet the script details and the confidence in the support they offer.

On the basis of analyzing these questionnaires and discussions of committee members, the two ERP vendors short-listed were Oracle and PeopleSoft. The selection team went to these vendors again with more specific concerns about handling the business cases. After considering their responses, committee member decided to use voting as a basis of final selection. Before voting everyone agreed to accept whatever the result of the vote would be and cooperate with the others in getting the systems operational.

All the members had similar power in voting except for the project manager who was excluded. The votes were 12 for Oracle and 7 for PeopleSoft. Votes were announced verbally by members starting by the project sponsor. It is not known whether the project sponsor's

vote for Oracle did influence voting decisions of other members because he employed half of the people voting!

The whole selection process started in May 1998 and the final decision to go for Oracle was around October or November the same year. By April 1999 two systems became operational. These were Finance and purchasing. The HR system and the payroll system were planned to be operational by September 1999 and April 2000 respectively.

Having finalized the vendor, committee members were reduced to five personnel. These included the same people in the initial committee excluding the project sponsor who was replaced by a catalogue manager.

Committee members plus people from specialized functions went to Oracle for training. Training lasted three weeks and covered the whole set of modules chosen. These training sessions mainly covered operational analysis and the comparison of the HSP's system to that of Oracle. These were documented and alternatives were suggested by Oracle to resolve conflicting issues. One of the modules HSP requested wasn't part of the modules supplied by Oracle. However Oracle advised the client of other suppliers to consider.

Management supported the selection committee through the whole process. They employed contract relief staff to make up for the time they took off for project commitment. This section described the evaluation, selection and implementation process of the ERP project in HSP. The next section will try to map the different decision-making models reviewed earlier with those made during the project's lifecycle.

## **Mapping the ERP project decision making models**

Decision-making models reviewed earlier are mapped to the different phases of the ERP project as part of Table 2. An explanation of the applicability of decision-making models to each project phase is discussed.

It is observed that for the initiation phase, the choice of the consultant was a political decision. The big-five firm had a working relationship with the client organization and that was the only reason for that choice. It can also be envisaged that such a decision was made at a higher level of the organization structure.

The requirement analysis phase included several sub stages; the definition of key business processes (KBP), inviting vendors to bid and vendor short-listing. Decisions for the definition of KBP stage followed the adaptive model. Three to five processes were defined as the fundamental processes the organization has to excel on. The organizational objectives were the starting point and deciding on the KBP followed many discussions with functional units.

**Table 2: Mapping decision-making models to the different phases of the ERP project**

Project phase	Decision making Models					
	1. The classical model	2. The administrative model	3. The incremental model	4. The adaptive model	5. The Irrational model	6. The Political model
Initiation						X
Requirement analysis (RA)/ definition of KBP				X		
RA/ inviting vendors to bid						X
RA/ vendor short-listing		X				X
Design & implementation				X		
Post implementation		X				X

The list of vendors invited was initiated by the consultant, therefore it is likely to be considered a political decision. The consultant also managed the iterative vendor short-listing process. At the first set of presentations, Sap was dropped off the list followed by JDEdwards during the next cycle. These decisions are believed to follow the administrative model as only few alternatives were considered.

Finally, the successful vendor was chosen as part of a voting process where every member of the selection committee had an equal vote except for the consultant. Votes were announced starting by the project sponsor. As a result, its probable that the political model was more influential than the administrative decision-model that applies here as well.

The design and implementation phase included the three parties, client, consultant and vendor working together to configure the system. The process is iterative which suggests that it is the adaptive decision making model. When post implementation review is to be conducted, decisions are expected to follow the administrative model if handled by the same consultant, if another consulting firm is assigned the task then a mix of the administrative and the political models are envisaged to be representatives of decisions made.

Looking at Table 2, it is noticed that neither the classical nor the incremental or irrational models are included. The absence of the classical model can be attributed to the impracticality of this model to business context. The model if followed needed to develop all exiting alternatives and to choose the best solution. This is usually impractical in a changing business environment, especially one involving introducing a new technology (Moore, G., 1995). An explanation for excluding both the incremental and irrational models can be related to the

project having a strategic impact, thus objectives were well defined and communicated since the project start. This is believed to have eliminated decisions that stemmed from the status quo or that were irrational.

The political model has a wider representation than all other models, which indicates the influence of the stakeholders involved on the decision-making process. Similar finding has been reported by Newman et. al. (1990) who noted that the political model is applicable to complex systems which cross organizational boundaries, which is also the case for ERP. Both the administrative and adaptive models have equal representation with the adaptive model used for developing detailed objectives.

The results of the mapping process helped in gaining an understanding of the decision making models that are likely to be present for each phase of the ERP project lifecycle. This aids in better estimation of resource assignments when planning for the project. An adequate resource assignment, especially personnel involvement is considered one of the critical success factors for any IS/IT project.

### Conclusions

This study tried to apply six decision-making models to the different phases of the ERP project using the data from a case study of a health service provider organization in New Zealand. While some decision models apply others are missing. The three models that applied are the administrative, adaptive and political models. These findings suggests that (i) decisions during the lifecycle of the ERP project are structured or semi-structured; (ii) a small number of alternatives are evaluated; (iii) objectives for ERP projects are well defined and they guide the decision-making process; and (iv) personal and group politics influence decision-

making. Neither the classical nor the incremental or irrational models were present. This implies that decisions are least likely to be exhaustive, complicated or accidental. This study aids practitioners in understanding the decision making process throughout the lifecycle of the ERP project which eventually helps in better estimation of resource assignments at the planning stage. An adequate resource assignment, especially personnel involvement is considered one of the critical success factors for any IS/IT project. A benefit to academics is in providing insights into an area where little research is conducted. The results of this study can be extended to investigate further research in a particular stage of the ERP project. A survey research is also useful to consider the elements that can be generalized beyond the boundaries of the case discussed.

## Acknowledgements

The author, a Ph.D. candidate, is grateful for the detailed, constructive comments from Dr. Liaquat Hossain and the anonymous reviewers.

## References

Ballantine, Joan A. and Stray, Stephanie, "Information Systems and other Capital Investments: Evaluation Practice Compared", *Logistics Information Management*, (12) 1/2, 1999.

Caldas, Miguel P. & Wood, Jr., Thomaz "How consultants can help organizations survive the ERP frenzy", Paper submitted to the *Managerial Consultation Division of the Academy of Management to be considered for presentation at the annual meeting in Chicago*, August 1999, [www.gv.br/prof\\_alunos/thomaz/ingles/paper6.htm](http://www.gv.br/prof_alunos/thomaz/ingles/paper6.htm).

Carlino, Janelle and Kelly, Jamie, "AMR Research Predicts ERP Market will Reach \$66.6 Billion by 2003", *AMR Research*, May 18, 1999, [www.amrresearch.com/press/files/99518.asp](http://www.amrresearch.com/press/files/99518.asp).

Chung, Sock H. and Snyder, Charles A., "ERP Initiation: A Historical Perspective", *Proceedings of Americas Conference on Information Systems*, Milwaukee, 1999.

Gable, Guy, van den Heever, Roelf, Scott, Judy and Erlank, Steve, *Proceedings of the 3rd Pacific Asia Conference on Information Systems, Brisbane, Australia*, April 1-5, 1997, pp. 381-388

Gibson, N., Holland, C. and Light, B. "Enterprise Resource Planning: A Business Approach to Systems Development," in *Proceedings of the 32nd Hawaii International Conference on System Sciences, Hawaii*, IEEE Computer Society Press. Los Alamitos, California, 1999.

Hoy, Wayne K. & Tarter, C. John, "*Administrators Solving the Problems of Practice: Decision-Making Concepts, Cases, and Consequences*", Boston: Allyn and Bacon, 1995.

Janzen, Wayne, "How ERP and E-Technology Will Merge", *ERP NewsLetter*, Dec 16, 1999, [www.erpsupersite.com](http://www.erpsupersite.com).

Koh, Christine, Soh, Christina and Markus, M. Lynne, "A Process Theory Approach to Analyzing ERP Implementation and Impacts: The Case of Revel Asia", *Journal of Information Technology Cases and Applications*, Vol. 2, No. 1, 2000

Markus, M. Lynne, Tanis, Cornelis & Paul C. van Fenema, Paul C., "Multisite ERP Implementations", *Communications of the ACM*, Vol. 43, No. 4, April, 2000

Moore, Geoffrey A., "*Inside The Tornado: Marketing Strategies From Silicon Valley's Cutting Edge*", New York: HarperBusiness, 1995.

Newman, Michael and Noble, Faith, "User Involvement as an Interaction Process: A Case Study", *Information Systems Research*, Vol. 1, No. 1, 1990.

Parr, A., Shanks, G. and Darke, P., "The Identification of Necessary Factors for Successful Implementation of ERP Systems", *Proceedings of the IFIP Working Group 8.2 Conference on New Information Technologies in Organisational Process: Field Studies and Theoretical Reflections on the Future of Work*, 1999.