Setting the Scene for ERP Implementation

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Abstract

This paper is based upon a communication model of the rationales for ERP adoption. It focusses mainly on the themes of, rationality, values, and domination that underlie the model. The potential impact on the organisations that adopt them, in terms of their mission and the people that work within them are critically examined. Conclusions reached in the paper are that risks to organisational mission and work-life issues may be posed by the ERP adoption process.

Keywords: ERP, Communication, Critical Theory

1   Introduction

This paper explores an important role of language in Enterprise Resource Planning Systems (ERP) implementation: specifically how these systems are justified to the organisations that adopt them. ERP systems have an extensive organisational impact due to their broad scope, making them an important area of study. The implementation of an ERP project requires the acceptance, compliance, and commitment of a broad range of people: 'Implementing any integrated ERP solution is not so much a technological exercise but an "organizational revolution". Extensive preparation before implementation is the key to success' (Bingi, Sharma et al., 1999). One aspect of this preparation is justifying their adoption to this broad constituency and this paper presents a communication model of how this is effected. Firstly, to provide relevance, the paper addresses the extent of ERP adoption. The paper then explores the role of language in this context and draws attention to themes underlying ERP adoption. The study is then described and the model and its underlying themes discussed.

2   Enterprise Resource Planning Systems

ERP systems have made a great impact on the information systems landscape during the 1990s and continue to do so into the 21st century. By the end of 1999, ERP systems accounted

for over half the world's installed base of application software (Gable, van den Heever et al., 1997 p199). The vendor organisations most prominent in this market are SAP (the market leader), PeopleSoft, Baan, J.D. Edwards and Oracle. Willcocks (2000) reports that sales of ERP packages reached $20 billion in 2000 with a further $20 billion accruing to consultancy firms for advisory and installation services. Initially, ERP systems were adopted by the world's largest corporations. By 1999, most Fortune 500 companies had implemented ERP systems. As the high end of the market became saturated, ERP vendors moved to promote their products in medium sized organisations such as universities, and to regions beyond those initially penetrated in Europe and North America (Kumar &Van Hillegersberg, 2000).

Ross (1999) coined the phrase "ERP Revolution", illustrating the impact ERP systems have made on the information systems territory within organisations. The adoption of ERP systems has resulted in a wholesale replacement of older systems and operating processes (Mullin, 1999). ERP adoption is by far the largest and most far reaching Information Technology (IT) investment ever undertaken for many companies (Davenport, 1998), (Sumner, 1999). The magnitude of this 'revolution' occurring within the area of information systems provokes enquiry into the nature of the event, why it happened, how it was ushered in and what the implications are for the future.

3 Aspects of Language Use

3.1 Shaping Attitudes

Language can be viewed as a vehicle through which opinions are formed, attitudes shaped and behaviours affected. In an organisational context, language enables the construction of shared beliefs and concepts (Deetz, 1982). Language can be used to evoke support or opposition to social change, can serve to organize consensus, and can be used to explain, rationalize and legitimate planned activities (Pfeffer, 1981), (Mumby, 1988). Habermas (1984) too regards language as a medium through which actors can attempt to influence the beliefs, attitudes and behaviours of others. Language may therefore be used as a tool by management to legitimate and develop support for a decision it has made (Pfeffer, 1981). Resistance to change writes Robbins (1993) can be reduced by education and communication. Specifically, *the use of reason through the use of data and facts presented logically* is advocated. Managements' are well aware that a smoother transition to new procedures and techniques can be gained by convincing relevant constituencies that the new direction is the right one (Langley, 1989).

King (1997) regards the need to secure a commitment to a course of action as possibly a more important issue than the determination of the most appropriate evaluation technique. Essentially King is suggesting that achieving positive attitudes and behaviours directed towards a certain outcome may provide benefits that exceed those attainable from exercising optimum levels of choice. Gaining commitment to a decision requires that a decision provide evident value to constituents. In an organisational setting with large numbers of people to satisfy, providing evident value to all is a challenging task. It is conceivable constituents may be sufficiently persuaded by benefits conferred at the organisational, rather than the individual level. It suggests that the promulgation of broad ranging benefits that will affect many people will have greater influence than highly specific outcomes that will apply to only a few. Acceptance of a decision requires that the lesser goal of "making sense" be achieved (Suchman, 1995).

Renkema (1988) argues good communications are important in forming commitment to a decision. Every investment decision is made in a context of advantages, disadvantages and risks that can be both financial and non-financial. Renkema suggests issues should be made explicit and debated openly to achieve greater organisational support. This view resonates

with those of Habermas, who proposes the notion of communicative competence as a means of freeing people from political domination.

3.2   Justifying, Legitimising and Rationalising

Senior management are expected to understand the organisations they control and to explain the purpose of activities to parties both within and outside the organisation (Pfeffer, 1981 p184). A major investment in IS/IT infrastructure such as an ERP system is a situation that is likely to require explanation, rationalization and legitimation. To justify a course of action is to provide a supporting rationale. A justification or rationale is situated in a given social context, which itself affects the course of action chosen and what is regarded as an acceptable explanation (Pfeffer, 1981). Pfeffer (1981) also notes that Weick, Bem, and March have each pointed out that the activity or decision may precede the justification.

In western cultural settings, a strongly held norm for legitimating organisational activity is for it to be viewed as rational (Meyer &Rowan, 1977), (Pfeffer, 1981), (DiMaggio &Powell, 1983), (Staw, 1980). Pfeffer (1981) refers to the work of Parsons and Smelser in noting that rationality is more than a description of a decision-making procedure, it is a valued social ideal. In a pluralistic society agreement on values and preferences may be difficult to achieve, however consensus on technical matters is more straightforward.

Organisations not only act under norms of rationality, but as Thompson argues, they also seek to demonstrate such rationality to outside constituents (Staw, 1980). The need to portray an activity as rational may be enhanced further in public organisations, like educational institutions, which operate under highly ambiguous subjective goals because organisational survival is more likely to depend on perceptions that management is responsible, and that procedures are "rational", than on objective efficiency, which may be difficult to measure (Staw, 1980), (Langley, 1989). This creates a need to present an important decision like adopting an ERP system in rational terms, whether or not the decision to adopt was reached rationally, in order to legitimate the activity.

3.3   Reflecting Power Relations

Language is used in organisations to legitimate and control. A key issue in this process is therefore who is allowed to speak or write, about what, and when (Bergquist, 1995). In an organisational context, the ability to communicate reflects the power relations that persist (Krippendorf, 1980). The prevailing power relations provide management with a position of discursive monopoly (Deetz, 1992). The introduction of sophisticated electronic communication systems including the Internet and electronic mail has provided new means of organisational communication (Sharples, 1997), (Yates &Orlikowski, 1992). These media have the capacity to provide large quantities of information to a wide audience. Like other broadcast material they are highly suited to the rhetorical situation.

Yates (1992) refers to an analysis of the rhetorical situation by Blitzer as consisting of an exigency (in the form of an ERP system that needs to be implemented); an audience (the employees in the organisation where the ERP system is to be deployed); and a constraint, those with the power to influence the situation (the managers). This power or capacity to influence behaviour, as we have seen, is recognised in management texts. In the context of ERP adoption, where management seeks to gain the commitment of employees to the project, language becomes a vehicle for the exercise of power to legitimate change. Willcocks (1995) has pointed to this tactic of attempting to develop attitudes and behaviours that will foster cooperation and commitment to process and IT changes, through the use of rhetoric.

4   Underlying Themes

4.1   Values and Rationality

Where action is accompanied by rational planning, an assessment of the rationale may be made by a third party (Habermas, 1984). This paper is predicated on the ability of the author to assess and categorise the rationales presented by universities to justify ERP adoption. Underlying values may be discerned from the rationales that are presented for ERP adoption. Weber (1978) also identifies the importance of values in decision-making. Weber argues that the appropriateness of a range of ends may be assessed against a given value set. He suggests that the rationality of the choice of an action may be determined from the ends chosen, based on the values held. That is to say, the reason that one end is preferable to another depends on the values held by the individual or organisation. While it may not always be possible to quantify the desirability of alternative ends, they can be ranked. This 'value rationality' or 'substantive rationality' has political dimensions in organisations, as the collective nature of organisational values requires their continual re-statement.

Instrumental rationality or technical rationality, the term used by Deetz and Kersten which is quoted in Mumby (1988 p33), relates to the selection of alternative means to achieve a given end. Alternative means can in principle be quantified, which enables a precise comparison between them. Instrumental rationality only depends on values to the limited extent provided by utilitarian considerations which dictate that in general, cheaper alternatives are preferable to more costly alternatives, faster alternatives preferable to slower ones. Although instrumentally rational decisions are made within a relatively narrow frame of reference, measurement issues still present considerable problems. This emphasis on productivity in western society extends beyond businesses that are concerned with producing things, to services such as education. The idea of providing the same level of teaching with less effort, or accomplishing the administrative tasks of an institution more cheaply tends to be valued. Consequently we may expect the justifications for an investment in an ERP system to express technical and/or value rational ideals.

Strategic action depends upon the correct evaluation of alternative choices, which results from calculation supplemented by values and maxims (Habermas, 1971, 1984). Habermas (1984) defines strategic rationality as embracing consideration of the rational decisions of others who are considered as opponents. Consequently if a decision by an organisation to adopt an ERP system does not depend solely on internal assessments, but takes account of the behaviour of other organisations with respect to their adoption or non-adoption of ERP systems, strategic rationality is being employed.

Cecez-Kecmanovic (2000, 2001, 2002) has examined the role of rationality in information systems deployment and states:

> …if it is possible to determine a type of rationality supported or enabled by an IS, then the expected social and organizational implications of such a system may be better understood and assessed based on the predicted or observed increase of this type of rationality. *(Cecez-Kecmanovic, Janson et al., 2002 p216)*

This provides a very clear indication of the usefulness of exploring the rationales used in the deployment of ERPs'. Without a clear understanding of why systems are deployed and the nature of their intended effects it is difficult to make sense of the perceived outcomes. Moreover it should be no more difficult to infer a rationality type from the justification of a particular system than from the system itself. The qualification "if it is possible" which begins the above quotation suggests that inferring rationality types is not a straightforward activity.

The rationale for the adoption of a new type of information system, such as an ERP system, would appear to be predominantly an issue of instrumental rationality, though it is possible

there may be other underlying rationality types. This study assesses the rationality types that underpin the rationales presented.

4.2 Domination

A study of rationales also enables issues of domination to be examined. Domination occurs when particular sectional interests are privileged to the detriment of other groups, who are in a state of relative powerlessness with respect to the dominating group. For Habermas, emancipation works via self-reflection 'to liberate people from the illusions and ideologies that embrace them, through an understanding of them' (McClure, 1991). But, as Lyytinen and Klein (1985) observe in their study of how Habermasian ideas could be applied to IS research, the application of the concept of emancipation is far from obvious.

Habermas (1971) suggests that technology can exert a form of domination and as technology is inherent in information systems, we need to be conscious of potentially adverse effects. He concludes that issues of instrumental rationality have subsumed those of practical and affective reason. In other words, society has tended to concentrate its attention on issues that relate to the technical performance of social components, as opposed to those of overall purpose and direction.

Marcuse (1970) also argues that technology may exert a type of control over people themselves, contrary to the apparent purpose of the application of technology as a tool or adjunct for productive activities. Marcuse (1970) addresses the potential for technological domination in terms of rationality in the following:

> If the Good and the Beautiful, Peace and Justice cannot be derived either from ontological or scientific-rational conditions, they cannot logically claim universal validity and realization (p122).

He presents the thesis that the tendency to privilege the technological creates distortions within society. In a context of technological domination, managers and workers alike become servants of the needs of technical systems of production (Schroyer, 1975). However, technical systems of production must be legitimated by the societies in which they operate, otherwise they would fall into disuse, as a result of their failure to meet socially constructed expectations.

5 The Study

5.1 Theoretical Background

In common with other types of investment activity, the adoption of an ERP system is a purposive intervention by an organisation to bring about a new state of affairs judged to be superior to the current state. In presenting a rationale for this course of action, the organisation makes statements about the existing and desired states of affairs. A third party may assess the validity claims embedded in these statements on the basis of their truth, rightness, appropriateness and intelligibility. These are the four components of communicative competence defined by Habermas (1984), through which *communicative rationality* is reached.

Statements concerning ERP adoption can express two types of rational relation to the world. From one perspective statements are made about that which exists, and from the other direction statements about the proposed course of action, ERP adoption. Since they are grounded in knowledge of existing and proposed information systems, statements about the existing state of affairs, can in principle be assessed on the basis of their truth or falsity, and statements about the proposed state on whether they are likely to achieve or fail to achieve the

intended effect. These relations are rational because they are open to objective appraisal and can be judged according to criteria of *truth* and *efficacy*." (Habermas, 1984).

The purpose of this research is not to assess whether the statements are truthful or otherwise. It is the extent to which these statements cohere that enables the construction of a model of ERP adoption and provides the opportunity for critical assessment of what is valued, or considered important in the context of ERP adoption.

5.2   The Method used in the Study - Grounded Theory

The research task was to identify the rationalizations used to justify the adoption of ERP systems and to organise these into an explanatory scheme. The Grounded Theory (GT) approach to theory development advocated by Strauss (1998) seemed most appropriate for this purpose. GT is based on discovering concepts and relationships in raw data. Grounded Theory is a qualitative, investigative approach to research that endeavours to find the truth through a series of consecutive data collection steps, and may use a variety of data sources such as interviews or different types of textual materials. The approach is referred to as "grounded theory" because the investigation produces a theory that is grounded in the data - not one that precedes the data, which is the case with positivist, quantitative, statistically based research (Romm, 1999).

The researcher starts with a very basic framework of the research question. This is because when using GT, concepts should be developed using an open-minded approach and should not be inhibited by preconceptions. The researcher endeavours to locate consensus of evidence from the field of enquiry. Some tacit knowledge is acknowledged from the necessary capacity on the part of the researcher to sense the important concepts within the chosen field of enquiry. An initial focus rather than a hypothesis, is therefore inevitable but this should not direct or constrain the research (Guba &Lincoln, 1989). Theory emerges at the end, not the beginning, of the study (Eisenhart, 1989). Theory development and conceptualisations emerge and are refined as the data is iteratively examined and analysed. In GT the investigation is completed when no new data that would add to the "theory" can be identified.

Information systems define a territory within organisations inhabited by processes, technology (hardware, software, and databases) and people (Khazanchi &Munkvold, 2000), (Laudon &Laudon, 1984). Upon this basis, the domains Organisation, Process, Technology and People are used to provide this basic framework, shown in figure 1.
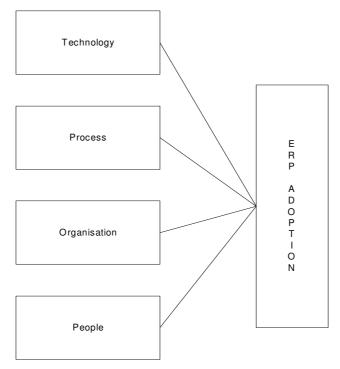
Figure 1: The Basic Model of ERP Justification

5.3   The Subjects

Universities were chosen as subjects for the study for a number of reasons. Firstly, universities are substantial and experienced users of IT, and a significant number have purchased ERP systems. Secondly, Rands (1992) and Weill (1989) have argued that the requirements for software acquisition vary considerably across different industries. Not only does the demand for software vary across industries, so to does the source of supply. Universities are a specific vertical market targeted by ERP vendors, which conveniently identifies stability on the supply side as well as the demand side. Restriction to a particular industry and market segment, prevent industry and market effects that might be uneven across industry sectors, from distorting the analysis.

Also, following the direction given by Eisenhart (1989) that the process of interest must be transparently observable, universities qualify as suitable candidates. Universities have formal approaches to action and their activities are habitually documented. Also, many universities have placed material relevant to this research programme in an accessible form on their Web sites. This varied collection of documents includes Requests For Proposal (RFP), publicity statements and committee reports relating to the ERP project.

Data for this study was obtained from a sample of universities taken from the population of universities that have adopted ERP systems. From this population, only those universities that made their rationale for adopting ERP systems accessible in an electronic form were considered. Sufficient data to enable a point of theoretical saturation to be reached was obtained from a sample of eight universities (six from the USA and two from Australia) as shown in table 1.

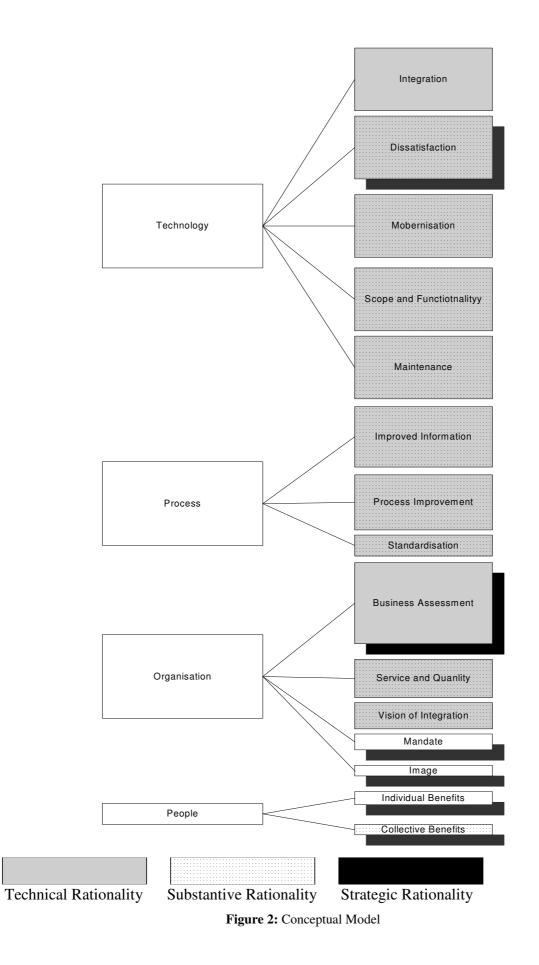| University	Characteristics
California State University	Very Large Multi Campus University, USA
Central Queensland University	Small Regional Multi Campus University, Australia
University of Colorado	Large Multi Campus Research University, USA
Duke University	Private University with Medical School, USA
University of Michigan	Large Research University, USA
University of Minnesota	Large State Run Metropolitan University, USA
University of Nebraska	Regional Multi Campus University, USA
University of New South Wales	Large Research University, Australia

Table 1: Universities Studied

5.4   Sources and Volume of Data Analysed

Table 2 illustrates the sources and volume of data analysed in this study. Column one shows the universities studied, column two lists the abbreviations used for each university, column three shows the number of documents analysed from each university. The total word count is shown in the fourth column and the number of referenced passages in the fifth column. As shown in table 2 over one thousand references were identified and classified from a total of fifty-seven documents.

Universities Studied	Abbreviation	Number of Documents	Word Count	Reference Count
California State University	CSU	7	8680	121
Central Queensland University	CQU	5	2994	82
University of Colorado	UoC	6	30847	204
Duke University	Duke	5	15700	144
University of Michigan	UoM	7	36114	219
University of Minnesota	Minne	11	6863	91
University of Nebraska	UoN	8	10116	59
University of New South Wales	UNSW	8	32555	106
Total		57	143869	1026

Table 2: Sources of data

Figure 2: Conceptual Model

5.5   The model

Although a precise measurement of the strength of each conceptual category cannot be given using this methodology, it is claimed that in combination, the statements used to create the conceptual categories, the number of dimensions within a conceptual category, the level of agreement within those dimensions and the frequency of reference within each conceptual category provide strong indicators of their actual and relative strength. A specimen conceptual category is shown in Appendix A, as there is insufficient space to discuss them all, and summary details of all conceptual categories are shown in Appendix B. The size with which conceptual categories are depicted in the sub-trees that are presented in figure 2 is intended to give an indication of their relative strength and is in proportion to the measures presented in Appendix B. The shading that decorates each conceptual category indicates its underlying rationality type.

6   Overview of the Model

It can be seen from the size of the domains illustrated in figure 2 that the Technology and Process domains demonstrate a degree of dominance over those of Organisation and People. This tendency was especially pronounced with respect to People. It seems clear that people are subservient to the aspirations of instrumental rationality expressed in the Technology and Process domains. People appear as objects to be influenced by the application of strategic rationality within the People domain. The model indicates technology has developed a dominant role in organisations. Further discussion of these issues can be found in (Oliver &Romm, 2002).

Integration in all its forms, **Improved Information,** and **Process Improvement,** account for the majority of all justificatory statements indicating an underlying agenda of increased managerial control. This observation must moderate any inclination to view the Technology and Process domains as acting autonomously on the Organisation domain. Conceptual categories relating to integration are found in the Technology domain (**Integration**), the Process domain (**Standardisation**) and the Organisation domain (**Vision of Integration**) and include both instrumental and substantive rationales. Greater integration and standardisation are likely to result in restrictions on individual or departmental initiative. Greater integration is linked to better information, which may be motivated by a desire for firmer control from the apex of the organisation and also tends towards a preference for technology over people.

Some indications of a focus on the needs of people were discerned in terms of the rationale of greater job satisfaction and empowerment for employees, and better service and quality provided to customers. Whether these systems increase the fulfilment people derive from their work and serve to increase the capacity of universities to teach and research more effectively as some People domain rationales suggest is a subject for further research.

A mix of instrumental, substantive and strategic rationality types are exhibited in the model. It was considered at the outset that the presentation of a rationale for ERP adoption had in part a strategic purpose, as it is an attempt to influence the organisational constituency to react favourably to the decision to adopt an ERP system. So, even if a conceptual category is constituted using technical or substantive rationality, its presentation may to some extent represent the use of strategic rationality. A conceptual category may exhibit multiple underlying influences in terms of its rationality types. Where a conceptual category exhibited multiple rationality types no attempt to make a proportional allocation has been made. This study has been an exercise in detection of underlying influences rather than their measurement.

Technical rationality occurs primarily in the Technology and Process domains but substantive rationality also figures in these domains. The substantive values exhibited are not the higher values quoted earlier from Marcuse but are manifestations of technology and rationalising

preferences themselves that have matured over a long period. This is further confirmation of the extent to which the values of technical rationality have become embedded in the thought patterns of modern western societies. In other words, technology has come to be valued in itself, not necessarily because it is technically rational to use it in a particular context. A solution that is seemingly technologically advanced may be more attractive than one that is more effective but does not use technology, because of the value placed on the use of technology per se.

Strategic rationality, which is also concerned with the exercise of choice among alternatives, includes an assessment of the actions of others (Habermas, 1984). Others, in this context are other universities (from the point of view of their adoption of ERP systems) and also the employees of the organisation as distinct from the managers. Strategic rationality is most evident in the Organisation and People domains. Strategic rationality in the context of ERP adoption is concerned with whether ERP adoption is the best course of action with respect to alternatives and also seeking to achieve success for the chosen outcome. Strategic rationality is also concerned with positioning the institution alongside other ERP adopters to avoid the risks of technical isolation and influencing others (including the others within) in order to achieve the effective deployment of the system.

Emancipation is the converse of domination and implies release from it. A barrier to emancipation would seem to be the general support of the rationalising and technology agendas, which as we have seen are used to legitimise ERP adoption, thus indicating its social acceptance.

7   Conclusions

The substantive value of technology detected here is evidence that the life-world has indeed been further colonised by technology as suggested by Habermas. The privileging of technology over people, also evident in the writing of Zuboff (1988) and Brooke (2001), is an issue that continues to deserve critical reflection. This value placed on technology is partly for efficiency reasons (the instrumental rationales), partly because technology is valued intrinsically by western societies, and partly because it appears to satisfy the aspirations for increased managerial control.

Although the People domain has a low profile, those rationales that are presented can be assessed as favourable to them, for example increased job satisfaction. It would seem rational in affluent western societies, to elevate quality of life issues in relation to work to a high level, as suggested by Alvesson (1987). In this study, 'humanistic' rationality, which is in effect a value rationality of work-life quality, is in a position of considerable deficit in relation to the attention given to technical rationality and the value placed on technology, manifesting as substantive rationality.

In the university context in which this research was situated, this apparent dominance of Technology and Process would seem to pose a threat to both the values and aspirations of the organisation, namely the knowledge creation, teaching and research objectives and the people who work in them. It is suggested that teaching, research and faculty will benefit from a transfer of resources enabled by ERP adoption. These People domain rationales are relatively scant and must be tempered by the somewhat muted attention to the cost of ERP adoption in the Organisation domain, indicating that this outcome is more of a hope than an expectation. The impact of ERPs on the mission of organisations and in particular universities therefore deserves further examination.

From the perspective of instrumental rationality a university only needs to consider whether ERP adoption is the most effective alternative for providing administrative services. Despite appearing to be a relatively limited question, it is nevertheless a difficult analytical problem to

address formally, which is perhaps why, in this study and that of Vitale (1997), many universities appear to avoid doing so. If the costs and benefits of major transformative exercises like ERP adoption are not well understood it would seem to indicate that an organisation could unintentionally divert excessive resources away from core activities. Allocating excessive resources in order to increase managerial control, with the effect of losing control over more fundamental objectives would be an ironic but possible consequence of adopting an ERP system. The implication here is for management to not consider issues in isolation but to consider the overall organisational impact of a course of action.

Published rationales cannot by definition exhibit communicative rationality because they are unidirectional. A closer approximation to communicative rationality in the organisational context would be to provide a more open discussion of organisational change. Therefore one implication from this research is to speculate on the possible consequences of a more discursive approach to situations of this type. It seems likely that a deeper understanding of the consequences of ERP adoption would be generated in a more discursive climate. This more open communication might help develop a better understanding of the challenges surrounding change of this magnitude and therefore a higher degree of preparedness for what is in store. This in turn would lead to the generation of more realistic expectations during implementation and possibly better outcomes.

Conflicts may emerge between preferences generated by different rationality systems. There is a danger that aspirations of ever-increasing levels of technical efficiency lead to the progressive rationalization of society, where ends eventually become subservient to means. According Habermas (1984, 1987) there is a danger that the process of progressive rationalization achieved through introducing systems of ever increasing complexity will 'colonize the lifeworld'. This expression relates to the suppression of the social value systems and artistic dimensions of life by the technical. This analysis seems to confirm the ongoing nature of this process of colonisation.

ERP systems are probably among the most complex administrative systems that have been developed for business administration in general and university administration in particular. Therefore, following the reasoning of Habermas, there needs to be an awareness that universities may, by following this technologically based agenda, be inclined to pursue more efficient administrative systems at the expense of their intrinsic goals associated with the generation and transmission of knowledge achieved through the traditional roles of research and teaching. The issue of possible tension arising between administrative control, technology and process on the one hand, and organisational role and purpose on the other, identified here in this study of ERP adoption, present as areas for future research.

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Appendix A

To provide an insight into how the analysis proceeded a discussion of one of the smallest conceptual categories (***Image***) is provided. As shown in table 3. the only dimension of ***Image*** is *to improve external perceptions*, which has a level of agreement of four.

	CSU	CQU	UoC	Duke	UoM	Minne	UoN	UNSW	Level of agreement
to improve external perceptions				Yes		Yes	Yes	Yes	4
Level of agreement	0	0	0	1	0	1	1	1	4

Table 3: Image - Dimensions

The fact that half of the universities made statements anticipating an improvement in external perceptions as a consequence of adopting an ERP system indicates improvement in image is a factor in ERP adoption. The following statements from the University of Minnesota and the University of New South Wales support this analysis.

> To improve external perception in the wider community of the University of Minnesota as innovative, cost-effective, and efficient. *(University of Minnesota)*

> Enhance the view that the University is an information technologically advanced and open institution; *(University of New South Wales, 1998 p10)*

Although the 1% frequency of reference (see table 4) does not suggest this is an especially important issue for universities adopting ERP systems, in this case the frequency of reference may tend to underestimate the strength of this conceptual category. Publishing information relating to ERP adoption on the Internet is to some extent a publicity exercise, indicating that image raising is being done rather than said to be done. The fact that half of the universities analysed make statements that anticipate an improvement in external perceptions as a consequence of adopting an ERP system suggests improvement in image needs to be recognized as a factor in ERP adoption. Overall the measures used in this analysis may understate the importance of this conceptual category.

University	Content
University of New South Wales	1.9
University of Nebraska	1.7
Duke University	1.4
University of Michigan	1.4
University of Minnesota	1.1
University of Colorado	0.5
California State University	0.0
Central Queensland University	0.0
Mean	1.0
Standard Deviation	0.7

Table 4: Image by Percentage Reference

The ***Image*** conceptual category is a demonstration of strategic rationality. By aligning themselves with the technological values assumed held in society, universities are acting strategically in order to enhance their standing in the community.

Appendix B

Domains, and *Conceptual Categories*	Number of Dimensions	Level of agreement	Percentage reference
Technology			
Integration	7	29	10.3
Dissatisfaction	6	28	9.0
Modernisation	4	20	7.8
Maintenance	3	10	2.1
Scope and Functionality	2	9	3.6
Total	22	96	32.8
Process			
Improved Information	5	27	16.4
Process improvement	5	24	15.5
Standardisation	3	10	2.6
Total	13	61	34.5
Organisation			
Business Assessment	12	43	8.5
Service and Quality	3	14	6.2
Vision of Integration	2	8	10.8
Mandate	2	8	2.0
Image	1	4	1.0
Total	22	78	28.5
People			
Individual Benefits	4	10	2.4
Collective Benefits	2	5	1.8
Total	6	15	4.2

Table 5: Conceptual Categories within Domains