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Decision Making for ERP Investments from the Perspective of Organizational Impact -Preliminary Results from an Empirical Study

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Abstract

This study addresses the complex relationship between decision making for ERP investments and the consideration of organizational impact under 2 different perspectives: Enterprise Resource Planning (ERP) system decisions in organizations with Business Process Improvement (BPI) in particular Business Process Reengineering (BPR) efforts and ERP decisions without BPI/BPR efforts. On the basis of a questionnaire sent to 813 austrian middle und large scale organizations, this paper shows that companies have weighted the inquired decision aspects very differently. ERP decisions are frequently made without a complete consideration and evaluation of all inquired aspects. Furthermore mainly standard financial measures have been used to support the decision. We propose that ERP decision making models can be based on the concept of bounded rationality and satisficing.

Conceptual Background

An Enterprise Resource Planning (ERP) system is an organizational and management solution based on information technology towards challenges and problems in the business environment (Laudon et al. 1998). The power and potential of such systems need to be understood from the business perspective in order to choose the most appropriate ERP solution. This is a semi-structured decision problem because only part of the problem can be handled by a definite or accepted procedure such as standard investment calculations and on the other hand the decision maker needs to judge and evaluate all relevant (and intangible) business impact aspects. There is no agreed-upon and formal procedure for this important task (Laudon et al. 1998; Hecht 1997). Nevertheless the corresponding decisions strongly influence long-term business success. This paper investigates, i) how managers in Austrian middle and large scale businesses have weighted the inquired aspects of this decision problem, ii) what the most important aspects concerning organizational impact for these decision makers were, and iii) to what degree process characteristics in the case of a supplementary Business Process Improvement (BPI) initiative have been considered.

We attempt to answer the questions i) and ii) under 2 different perspectives: ERP investments in organizations with Business Process Improvement in particular Business Process Reengineering (BPR) efforts and ERP investments without BPI/BPR efforts. In order to maximize the benefits of ERP investments the supplementary redesign of business processes promises the highest ROI but also increases the level of complexity, risk and costs especially in the implementation stage of any ERP system (Kirchmer 1998). For this reason the combination of ERP and BPI/BPR initiatives intensifies the problem to meet all necessary requirements, i.e. considering and evaluating all important aspects imposed by the environment of the organization.

Methodology

To investigate these research problems we chose to design an empirical study. The data collection method included the design of a questionnaire, various pretests and the mailing together with separate, prepaid envelopes. In all cases the focal point for contact was the senior management of the IT-departments. The sources for company addresses and respondents included subscribed customers of SAP and BaaN, complemented with the top 500 businesses in Austria measured by quantity of turnover. 813 Austrian middle and large scale companies have been addressed and 138 valid returns have been registered of which 120 supplied the information necessary for this study. This corresponds to a 17 percent return quota. A project group of graduate students participated in parts of this study.

Data Analysis

The following list of 17 inquired ERP decision making aspects have been identified through application of the Delphi Method together with students, practitioners and researchers of our institute (see Table 1). The mean value is used to express the declared importance of the

Nr.	Aspect	Mean	Std. Deviation	weighted as at least important (in percent)
1	Increased Transparency and Better Information-Flow	3.61	0.62	97
2	Shorter Cycle Times	3.43	0.67	91
3	Increased Organizational Flexibility	3.28	0.80	86
4	Y2K Problem	3.23	0.99	77
5	Increased Customer Satisfaction	3.16	0.88	78
6	Currency Conversion (i.e. Euro)	3.13	1.00	76
7	Short Implementation Time	3.10	0.77	84
8	Higher Reliability	3.09	0.83	84
9	Implementation of Desired Business Processes	3.05	0.83	79
10	Other Strategic Considerations	3.02	0.91	72
11	Improvement of Organizational Structure	2.87	0.78	68
12	Better Application of Managementstyle	2.52	0.80	50
13	Increased Know-How	2.50	0.85	49
14	Improved Innovation Capabilities	2.35	1.21	58
15	Improved Internet Services	2.20	0.84	39
16	Improved E-Commerce Support	2.05	0.85	28
17	Customer and Supplier Needs	1.99	1.03	30

Table 1: Inquired criteria of ERP decision making (including all 120 valid observations)

criteria and is used to order the list. The standard deviation shows how diverse the companies have weighted the aspects. The Y2K Problem for instance is a very important aspect for many companies but on the other hand not important for many other. The valid answers included the values: 1 (irrelevant), 2 (rather unimportant), 3 (important) and 4 (very important). Of these inquired ERP decision making aspects of which all are generally accepted as very important by literature 71 percent have been considered as important or very important by the majority of the organizations. The mean rate of classification of an aspect as important or very important is 67 percent. The data showed that only 7 out of 120 companies (5.8 percent) have rated all inquired decision aspects as at least important. These results show that the companies have weighted the inquired aspects very differently.

The data showed that aspects "Increased Transparency and Better Information-Flow" (number 1) and "Shorter Cycle Times" (number 2) were the most important in all of the following cases: i) all companies, ii) ERP investment together with BPI and iii) ERP investments without a BPI initiative. There is strong evidence that the aspects "Improved Innovation Capabilities" (number 14), "Increased Organizational Flexibility" (number 3), "Increased Customer Satisfaction" (number 5) and "Other Strategic Considerations" (number 10) are more important for companies from case ii) in comparison with case iii). This has been proved with Pearson Chi-Square Tests. The aspects 14, 3 and 10 are significant dependent on the supplementary accomplishment of BPI initiatives at the level of 0.01 and the other (aspect 5) at the level of 0.05. This indicates that aspects that contribute more to strategic advantage than others are overweighted by companies with BPI efforts. Note that 81 companies (68 percent) out of 120 valid observations have undertaken BPI efforts together with the ERP system decision and implementation.

Nr.	Process Improvement Characteristic (81 valid observations)	Consideration (in percent)
1	Shorter Process Times	72
2	Reduced Work Force	44
3	Stock Levels	43
4	Product Quality	31
5	Employee Utilization	23
6	Other	7

Table 2: Business process improvement factor consideration in ERP decisions together with BPI

For these 81 cases we have further analyzed to what degree process improvement factors have been considered in decision making. The minority of Austrian organizations have tried to utilize all inquired process improvement criteria (Table 2). All but one business process improvement criterion have not been considered by the majority.

Conclusions

These results show that the consideration and evaluation of the inquired aspects (Table 1 and Table 2) with respect to the importance of the decision is very low. The companies have weighted the inquired aspects very differently. ERP decisions are frequently made without a complete consideration and evaluation of all inquired aspects. Simon (1977) proposed that individuals faced with complex choices are unable to make objectively rational decisions because they cannot collect and process all information that would permit them to predict the consequences (bounded rationality) and that people partake in satisficing. This is choosing a subotimal but already available alternative to move closer toward their ultimate (business) goal. We suggest that ERP decision making as it is documented by the collected data can be modeled based on the concept of bounded rationality and satisficing. This suggestion is further encouraged because decision makers have mainly applied standard financial measures, which can only be used for tangible costs and benefits. Therefore many (intangible) decision aspects have not been taken into account. Further measures to assess the impact of the ERP decision such as the hedonistic modell or the determination of the value of information (Davis 1974) are (still) not being applied. This behavior leads to suboptimal results in this critical area.

Future Work

With this work we hope to contribute to the debate on choosing ERP solutions and the relationship to organizational impact. Our goal is to synthesize the insights from this study with findings from previous and future research on ERP systems and their organizational impact, decision theory and Business Process Reengineering into a coherent framework that will help to handle and solve ERP investment respectively decision problems.

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