

Association for Information Systems AIS Electronic Library (AISeL)

AMCIS 1997 Proceedings

Americas Conference on Information Systems
(AMCIS)

8-15-1997

Business Process Reengineering -Do Software Tools Matter?

Il Im

University of Southern California, iim@rcf.usc.edu

Omar El Sawy

University of Southern California

Alexander Hars

University of Southern California

Follow this and additional works at: <http://aisel.aisnet.org/amcis1997>

Recommended Citation

Im, Il; Sawy, Omar El; and Hars, Alexander, "Business Process Reengineering -Do Software Tools Matter?" (1997). *AMCIS 1997 Proceedings*. 65.

<http://aisel.aisnet.org/amcis1997/65>

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 1997 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Business Process Reengineering - Do Software Tools Matter?

[Il Im](#)

Omar El Sawy

Alexander Hars

Department of Information and Operations Management
Marshall School of Business
University of Southern California
LA, CA 90089-1421

Phone : (213)740-6817 Fax : (213)740-7313 E-mail : iim@rcf.usc.edu

Abstract

As the number of business process reengineering (BPR) projects increase in industry, there seems to be a large potential to reduce cost and increase quality through the use of software tools. Currently, more than 50 BPR tools are available, but there has been little research to determine which features of BPR tools are important for BPR success and how important BPR tools are in BPR projects. Research in the related area of tools for computer-aided software engineering (CASE) shows that software tools are not always likely to improve productivity.

To answer the questions raised above, we developed a model and tested it with a survey. As a first step, literature dealing with BPR procedures and BPR features was reviewed to elicit important features of BPR tools. Simultaneously literature regarding CASE tools failure was investigated to identify potential causes of failure of BPR tools. As a result, a framework of BPR tool features that can guide selection of BPR tools was developed. We also developed a BPR success model and a questionnaire to test the model. The questionnaire was distributed to BPR practitioners through electronic media.

The analysis of data shows that process visualization and process analysis features are key features for the success of BPR tools which is termed as "BPR tools competence" in this research. Organizational factors such as user support and change of work are also important for a successful use of BPR tools. One interesting result is that change of work caused by BPR tools has a positive effect on BPR tools competence which is opposite to CASE tools. A significant relationship between BPR tools competence and effectiveness of BPR projects was observed, while no significant relationship was observed between BPR tools competence and efficiency of the projects. The result implies that BPR tools are different from CASE tools in many aspects, and what managers should expect from BPR tools is improved quality of project rather than productivity.

1. Introduction

Although a large number of software tools to help BPR efforts have emerged in the market, the survey by Elzinga et al [1995] revealed industry practitioners note that the lack of user-friendly, yet flexible, software to support BPR is a major problem. It is surprising that despite the discrepancy between user needs and available tools, there have been only a few studies about BPR tools. Therefore, in order to provide a basis for evaluation and proper selection of BPR tools, research is needed to examine BPR tool features and their contribution to BPR success.

Many failures observed in computer-aided software engineering (CASE) tools [Norman et al., 1989; Sumner and Ryan, 1994; Kwok and Arnett, 1993] have brought concerns about similar patterns of BPR tools. There are likely to be similar difficulties in BPR projects, because both tools are common in that they support what are considered to be professional efforts, and they require learning to be fully utilized. On the other hand, there are many differences between the two tools. For instance, CASE tools can support virtually all aspects of software development, while BPR tools can not support many steps of BPR such as process implementation. Hence, we need to examine whether BPR tools have problems similar to CASE tools.

2. BPR tools success model

To test BPR success, we developed a model of BPR success shown in Figure 1. The success of a BPR project can be measured by two constructs, one is "effectiveness" and the other is "efficiency" of the project. In this research, effectiveness of BPR success is measured by "effectiveness of new process" and "increased competitive power", and efficiency is measured by "time" and "budget" of BPR project.

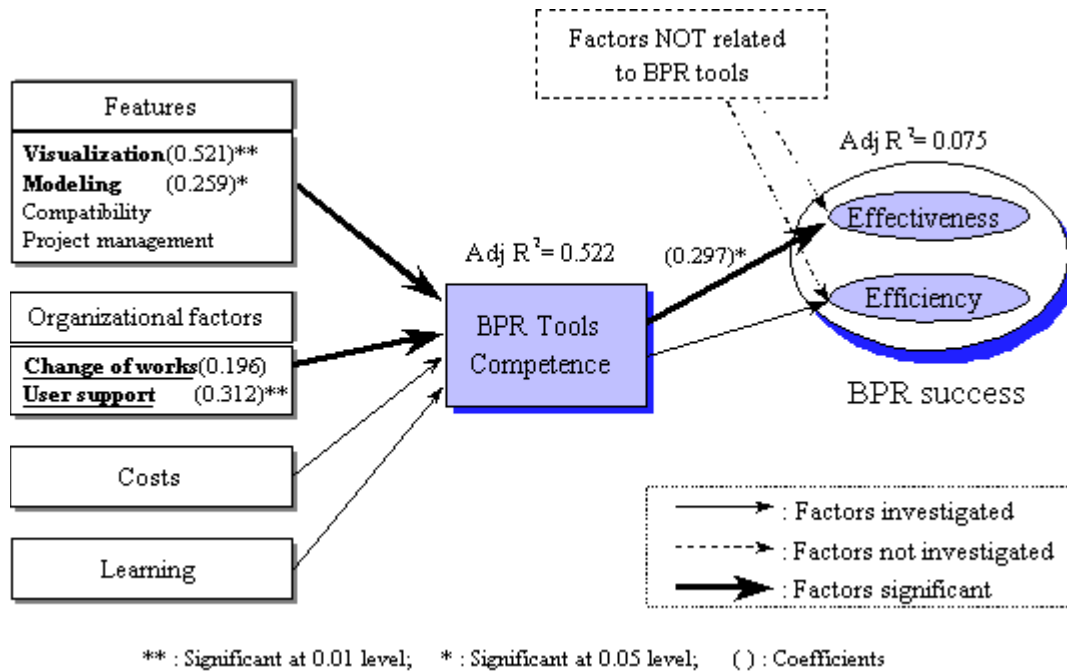


Figure 1. BPR tools success model and test results

Among BPR success factors, only some factors are directly related to BPR tools. To keep the scope of our study manageable, we excluded the factors not related directly to BPR tools in this research. The factors related to BPR tools can be represented by "the degree of _success of a BPR tool" which we term "BPR tools competence". Since a BPR tool is also a type of information system, the success of BPR tools can be measured by the framework of information systems success developed by DeLone and McLean [1992] which includes information quality, use, user satisfaction, and organizational impact.

The empirical studies about CASE tools success relied on learning time, costs, organizational factors and features as constructs which determine tools success. Learning time and costs can be measured directly, and organizational factor can be broken down into additional operational variables.

To operationalize BPR tools features requires a framework for these features. The framework in table 1 integrates BPR tools features proposed by two previous studies. It is organized by the three main components of a BPR project.

This framework was used in conjunction with an analysis of commercial BPR tools to derive operational measures. For the main component of BPR project, execution which aims at redesigning a process, two measures were defined: Process visualization & mapping (4 operational variables) and process modeling & analysis (3 operational variables). No measures were defined for modifying because the analysis of commercial BPR tools shows that currently there is very little support for this step. The planning and project management components were integrated into one measure that was broken down into three operational variables. The interview with a BPR expert confirmed these measures and showed that an

additional technical feature might be critical: data compatibility. This feature is related to the ability to import/export and share data with other tools such as CASE tools and workflow tools. Three operational variables were defined to measure data compatibility.

BPR procedure		Klein [1994]	Thé [1995]
Planning		BPR planning tool	Benchmark analysis tool
	Visualization & mapping	Organization entity analysis tool	Modeling tool
Execution	Modeling & measuring	Modeling analysis tool	Business process analysis tool Human resource analysis and design
		Activity-based costing tool	
		Graphical simulation tool	
		Business metrics tool	
	Benchmark analysis tool		
	Modifying		System development tool
Project management			Project management tool Coordination tool

Table 1. BPR tools functions

3. Survey and the results

In order to test the model shown in figure 1, a questionnaire was designed and surveyed. The target respondents were BPR practitioners who had participated in BPR projects and used BPR tools in those projects. The questionnaires were sent to the subscribers of a BPR list server. They could answer through e-mail, authors' web page (<http://www-rcf.usc.edu/~iim>), mail or fax. Figure 1 presents a graphical summary of the results, which is based on 83 valid responses.

An exploratory factor analysis was conducted to test whether our framework of features was valid. Principle component extraction and VARIMAX rotation methods were used. Most features were classified into the four proposed categories, and they showed high reliability which implies that our framework of BPR tool features is valid. The analysis shows that process visualization and process modeling features have significant positive impact on the BPR tools competence.

Organizational factors were factored into two constructs -- change of work and user support (perceived training, perceived productivity gain, and perceived loss of expertise). Both factors show high relationship with BPR tools competence. One counter-intuitive result is that change of work has a positive relationship with BPR competence. This implies that the changes caused by tools have a positive effect on the success of the tools. This may be the consequence of additional knowledge provided by the BPR tools - a theory-based BPR methodology, a consistent way of process representation, and so forth -- to users who are novices in BPR in many cases.

The costs and learning time do not seem to affect the competence of a BPR tool. One possible reason is the fact that BPR tools are relatively inexpensive and easy to learn. The average purchase cost of BPR tools used by the respondents is also very small compared with that of CASE tools.

It is interesting that BPR tools competence shows significant relationship with the effectiveness of BPR project, while there is no significant relationship with efficiency. This implies that managers should expect improvement of quality and effectiveness of BPR from software tools, rather than improvement of efficiency and cost reduction.

In summary, this research shows that managers need to understand the difference of BPR tools and CASE tools. Process visualization and process modeling features are important for selecting BPR tools. The effectiveness of BPR tools also hinges on organizational factors such as user support.

4. References

(Other references are available upon request)

Alavi, Maryam and Yoo, Youngjin, "Productivity Gains of BPR," *Information Systems Management*, Fall, 1995.

Clemons, Eric K., "Identifying Sources of Reengineering Failures: A Study of the Behavioral Factors Contributing to Reengineering Risks," *Journal of MIS*, Fall 1995.

DeLone, William H. and McLean, Ephraim R., "Information Systems Success: The Quest for the Dependent Variable," *Information Systems Research*, March, 1992.

Elzinga, D. Jack; Horak, Thomas; Lee, Chung-Yee; Bruner, Charles, "Business Process Management : Survey and Methodology," *IEEE Transactions on Engineering Management*, Vol. 42, No. 2. May, 1995.

Finlay, Paul N. and Mitchell, Andrew C., "Perceptions of the Benefits From the Introduction of CASE: An Empirical Study," *MIS Quarterly*, December, 1994.

Furey, Timothy R., "A Six-step Guide to Process Reengineering," *Planning & Review*, March/August 1993.

Grover, Varun; Jeong, Seung Ryul; Kettinger, William J.; and Teng, James T.C., "The Implementation of Business Process Reengineering," *Journal of MIS*, Summer, 1995.

Hammer, Michael and Champy, James, *Reengineering The Corporation*, Harper Business, 1993.

Henderson, John C. and Coopridge, Jay G., "Dimensions of I/S Planning and Design Aids : A Functional Model of CASE Technology," *Information Systems Research*, September, 1990.

Klein, Mark M., "Reengineering Methodologies and Tools : A Prescription for Enhancing Success," *Information Systems Management*, Spring, 1994.

McPartlin, John P., "Just Chasing Rainbow ?," *Information Week*, Feb. 1, 1993.

Necco, Charles R.; Tsai, Nancy W.; and Holgeson, Kreg W., "Current Usage of Case Software," *Journal of Systems Management*, May, 1989.

Norman, Ronald J.; Corbitt, Gail F.; Butler, Mark C.; and McElroy, Donna D., "CASE Technology Transfer : A Case Study of Unsuccessful Change," Journal of Systems Management, May, 1989.

Orlikowski, Wanda J., "CASE Tools as Organizational Change : Investigating Incremental and Radical Changes in Systems Development," MIS Quarterly, September 1993.

Senn, James A. and Wynekoop, Judy L., "The Other Side of CASE Implementation," Information Systems Management, Fall, 1995.

Subramanian, Girish H. and Zarnich, George E., "An Examination of Some Software Development Effort and Productivity Determinants in ICASE Tool Project," Journal of MIS, Spring, 1996.

Sumner, Mary and Ryan, Terence, "The Impact of CASE : Can It Achieve Critical Success Factors? ," Journal of Systems Management, June 1994.

Thé, Lee, "Now You Can Automate BPR," Datamation, March 1 1995a.

Thé, Lee, "Workflow Tackles the Productivity Paradox," Datamation, August 15, 1995b.

Business Process Reengineering - Do Software Tools Matter?