

***SIMTech Technical Report (MIT/01/027/PDDM)***

# **A Standard Methodology for IT-enabled Enterprise Business Process Reengineering**

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## 1 BACKGROUND

Business Process Re-engineering (BPR) has been a management concept since the late 1980s. Its popularity was greatly accelerated by an article published by Hammer in the Harvard Business Review [1]. The BPR strategy propounded by Hammer focused on organization and management changes to bring about radical business improvements. Another school of thought championed by researchers such as Davenport [2] and Venkatraman [3] advocated the use of IT as an important business process enabler leading to significant improvements in productivity. However, most of the BPR research works in the early and mid-1990s were strategic in nature, pioneered largely by the business management gurus from Harvard and MIT and focused mainly on radical organizational changes.

Many of these strategic management approaches do not relate the formulation of company strategies to their deployment via the company business processes at the tactical and operational levels.

The advent of BPR software tools in the later half of the 1990s provided a feasible and comprehensive means of modeling and evaluating complete virtual enterprises in terms of their organization, business processes, information and material flows, and the IT systems design and their functionalities. The primary goal of such a complete and detail modeling process is to ensure that IT-systems as enablers, are strategically aligned with the business goals and strategies of the enterprise.

The emergence of such BPR tools has transformed BPR from being uniquely a management approach to include reengineering of current tactical and operational company practices and the formulation of performance measures that can be easily tracked upon implementation of enterprise IT systems.

Recently, emerging key technologies like Internet and Web-centric technologies

have radically transformed the way in which businesses are carried out. Many Dot.com start-up companies have been hurriedly set up, and many failures have been reported. As predicted by a Gartner report<sup>[4]</sup>, seven in ten Dot.com companies would fail due to the lack of strategic directions and proper business process alignment. A shake-up of these companies actually occurred at the beginning of 2001. This confirms the need for the alignment of an enterprise's organization, business processes and IT systems to achieve the business goals and strategies through business process reengineering efforts.

Over the past five years, Gintic has been involved in several business process reengineering projects in different industrial sectors and with varying scope, most of which resulted in the selection of appropriate enterprise solutions to support the reengineered processes.

With a structured and proven approach, both for business process reengineering and for enterprise software selection, the likelihood of successfully implementing highly-complex enterprise-wide software systems is greatly enhanced.

## 2 OBJECTIVE

The fundamental strategy of manufacturing enterprises has not changed over the years i.e. delivering innovative leading-edge product at a better quality and faster and cheaper rate. However, the execution of this strategy especially in terms of the business processes and the underlying software and hardware infrastructure has changed considerably due to rapid advancement in technology, most notably, the internet and web technologies. This implies the need for a standard and flexible methodology to align the ever-changing business processes and the IT infrastructure to the strategy and goals of an enterprise. Any changes in the latter need to be reflected downstream quickly and managed effectively.

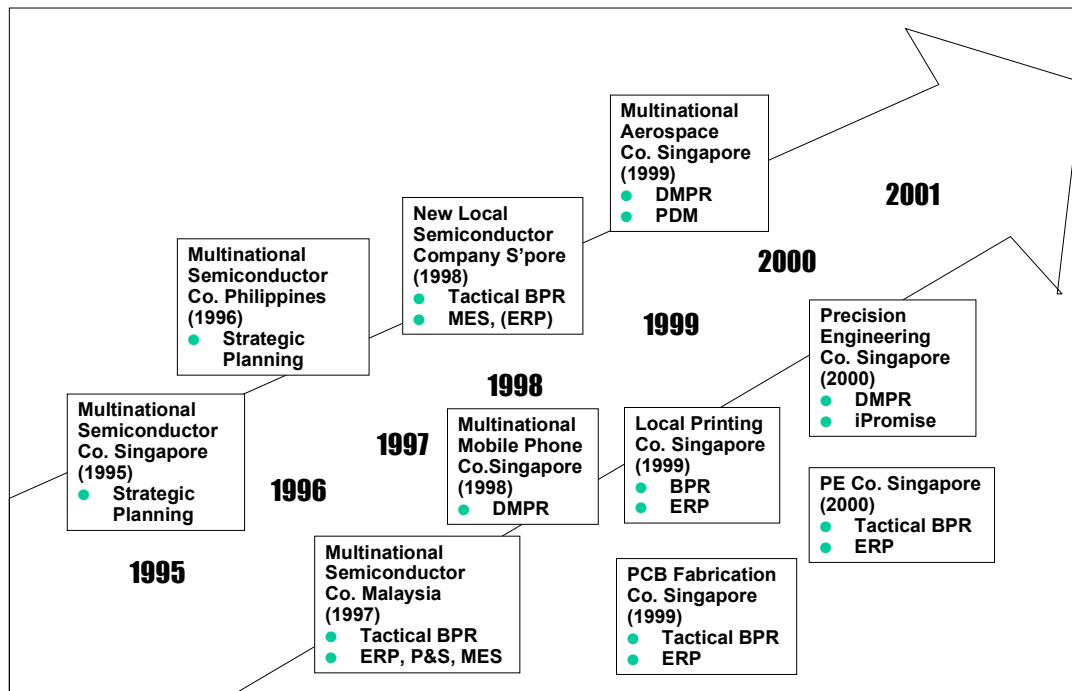


Figure 1: Past BPR Projects in Gintic

Figure 1 shows the BPR-related projects undertaken by Gintic over the last 5 years. From addressing reengineering business at the strategic level as propounded by academia, researchers at Gintic have gradually extended BPR efforts to tactical and operational levels in order to effectively align an organization with its business processes and the IT infrastructure to its business goals and strategies.

The primary objective of this research work is to formalize a standard methodology for BPR based on the experiences gained from past BPR projects.

In order to achieve this objective, a blue print for business process design that includes defining a comprehensive set of methodologies for business process reengineering, evaluation and selection of Enterprise-wide software to support the reengineered business processes is required.

### 3 METHODOLOGY

This comprehensive BPR methodology is knowledge-intensive and difficult to

formalize. It requires knowledge of the BPR tools and methods that are used (i.e. in this case the ARIS toolset<sup>TM</sup>, a market-leader in BPR tools based on a benchmarking done by Gartner<sup>[5]</sup>) and sufficient in-depth knowledge of the functionalities that off-the-shelf enterprise IT systems such as Enterprise Resource Planning (ERP), Advanced Planning & Scheduling (APS), Manufacturing Execution System (MES), etc. can provide. Since it involves reengineering of the business processes of an enterprise, industry-specific domain knowledge is clearly an asset.

Figure 2 shows an overview of the overall methodologies for business process reengineering and for enterprise software selection.

It can be divided into two distinct phases i.e. Business Process Reengineering and off-the-shelf IT Software benchmarking and selection.

<sup>TM</sup>ARIS stands for Architecture for Information System. The toolset is a product of IDS Scheer AG and is widely used for Enterprise Business Processing modeling.

**Phase I: Enterprise Business Process Reengineering**

agenda, presentations and schedules of meetings for the first two weeks.

Stage 1: Project Preparation

The preparatory stage of the project involves achieving a good preliminary understanding of the enterprise, their needs and requirements so as to derive an appropriate project proposal that will be within scope, budget and time. In addition, it also allocates time for planning some tasks that are crucial to the first phase of the project, such as project kick-off

Figure 3 shows the overall methodology for project preparation at stage 1.

Stage 2: Discovery

The discovery stage of the Project involves collecting and analyzing information about the company in terms of business and production goals, strategies, and practices, current and future requirements, problems encountered and

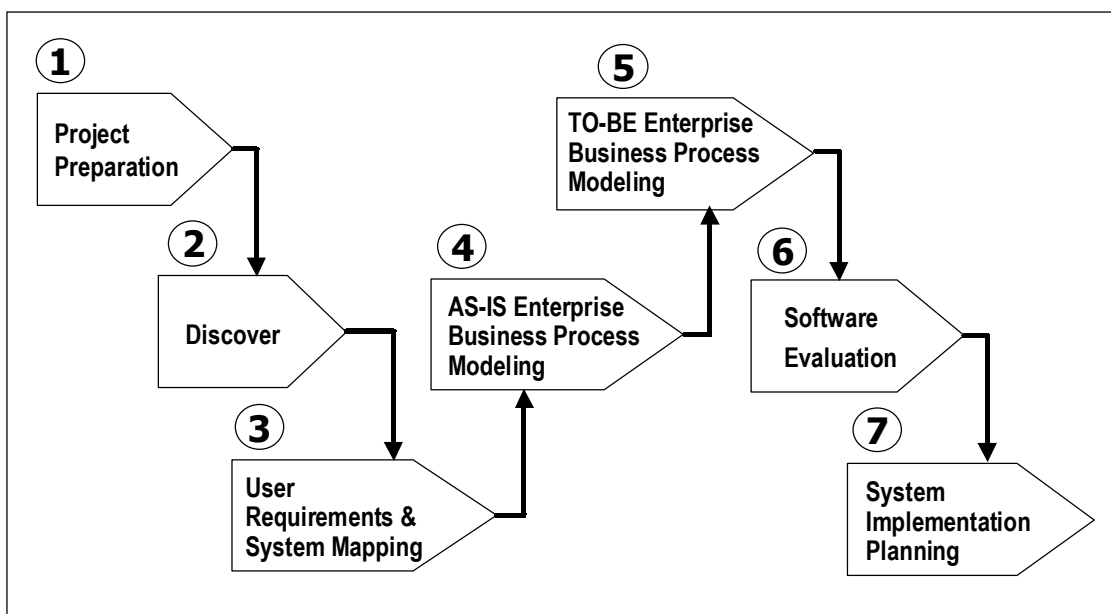


Figure 2: An Overview of the Methodologies for BPR and for Enterprise Software Selection

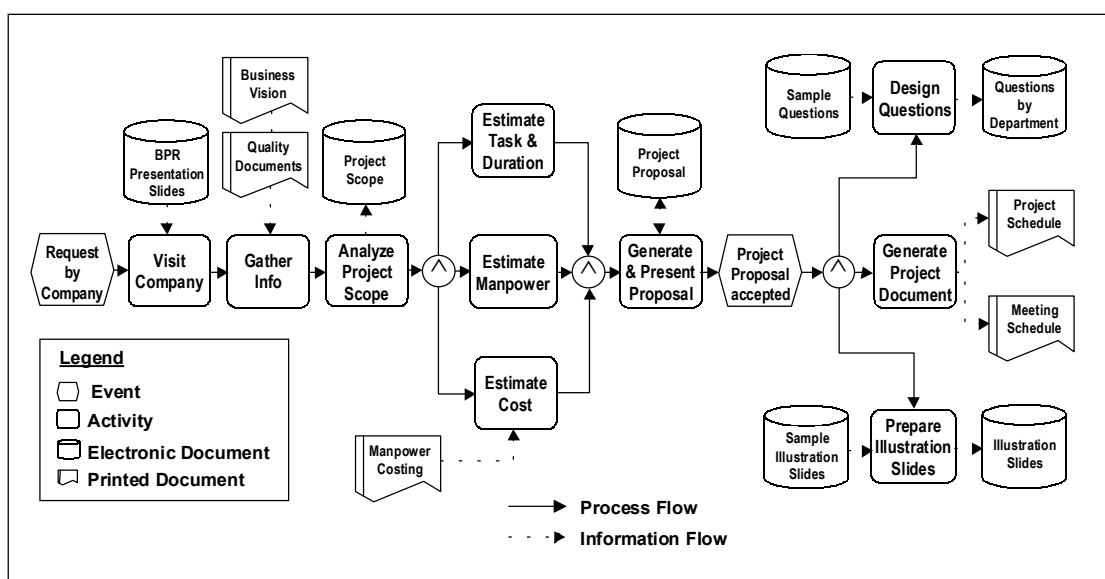


Figure 3: Stage 1 – Project Preparation



integrated model of the current business practices provides a framework for business process, material and information flow analyses.

Figure 5 shows the methodology for business process reengineering at stages 4 and 5.

Stage 5: To-Be Business Process Modeling

Analysis of the current practices results in the identification of areas of opportunities for improvement. Some common areas for improvement are removal of redundant or non-value added tasks, multiple entry of the same information, which may give rise to errors, unification and generalization of common tasks occurring in different departments, and redundant intermediate reports. Sometimes manpower reorganization may be required to smoothen the workflow across the enterprise and hence reducing the process cycle time.

The core activity at this critical stage is to generate the future or “To-Be” models describing how the business is to be managed in the future. These models also identified the major processes that need to be supported by IT-system functions in

order to achieve the goals of the company.

A major deliverable of this research work is the development of “best practice” models for a specific industry vertical. These models can subsequently be used as a knowledge base or a guide for new BPR practitioners and for providing companies with a roadmap for business process improvements.

**Phase II: Software Benchmarking & Selection**

Stage 6: Software Evaluation

A set of functional system requirements, which is based on the To-Be process models, is compiled as a benchmarking standard against off-the-shelf enterprise software systems. In addition, a set of guidelines or demo scripts is prepared for vendors to prototype their systems as a “proof-of-concept” that their systems are suitable for the company’s future way of managing business.

As the benchmarking rules are rather elaborate, details of this benchmarking methodology are provided in a separate report on “A standard methodology for Enterprise Software selection.”

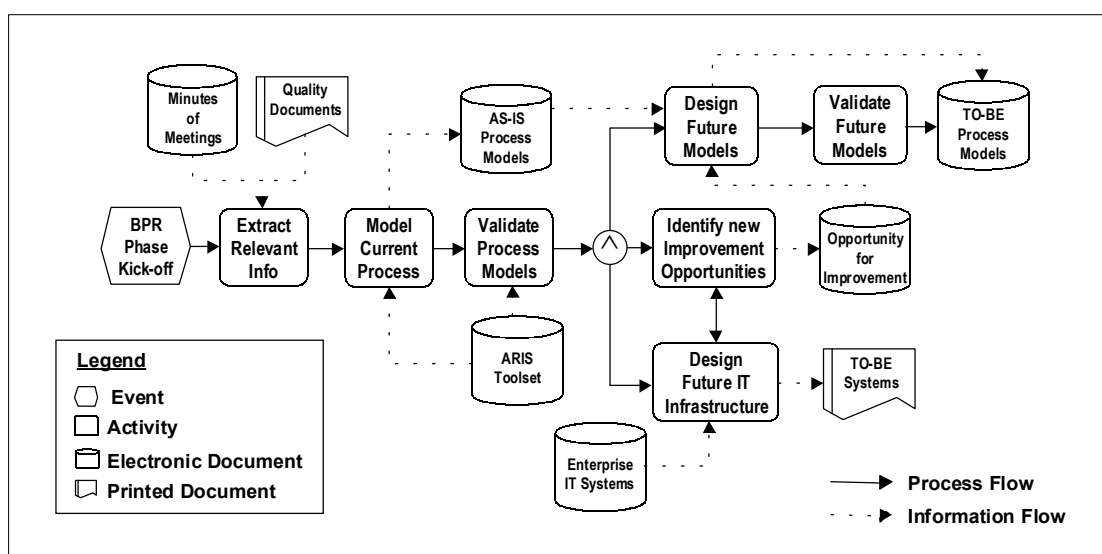


Figure 5: Stages 4-5 – AS-IS Business Process Modeling / To-be Business Process Modeling

Figure 6 shows a high-level view of the overall software evaluation methodology.

Stage 7: Implementation Planning

Once the software has been selected by the target company, detail implementation of the project begins.

Some major implementation planning tasks include the following:

- Propose an implementation strategy appropriate for the company,
- Identify the To-Be processes to be computerized,
- Identify functions that require customization and estimate the time and effort required,
- Identify reports that need to be generated by the system and their data sufficiency,
- Identify the project team and the involvement and responsibility of each individual member,
- Work out detail costs incurred over a 5-year investment period.

**4 RESULTS**

The methodologies for business process reengineering and software selection have been formalized and documented as a manual supplemented by electronic document templates for BPR practitioners.

In order to support future BPR work in similar industry sector, the following templates have been developed:

- Questionnaires for soliciting critical information pertaining to each functional area within an enterprise
- Functional description of typical IT application to manage business processes in each of the functional areas
- Matrix of typical user requirements translated into system specifications
- Opportunities for improvements in each of the functional areas
- “Best practice” models of the enterprise business in terms of process, information and material flows.

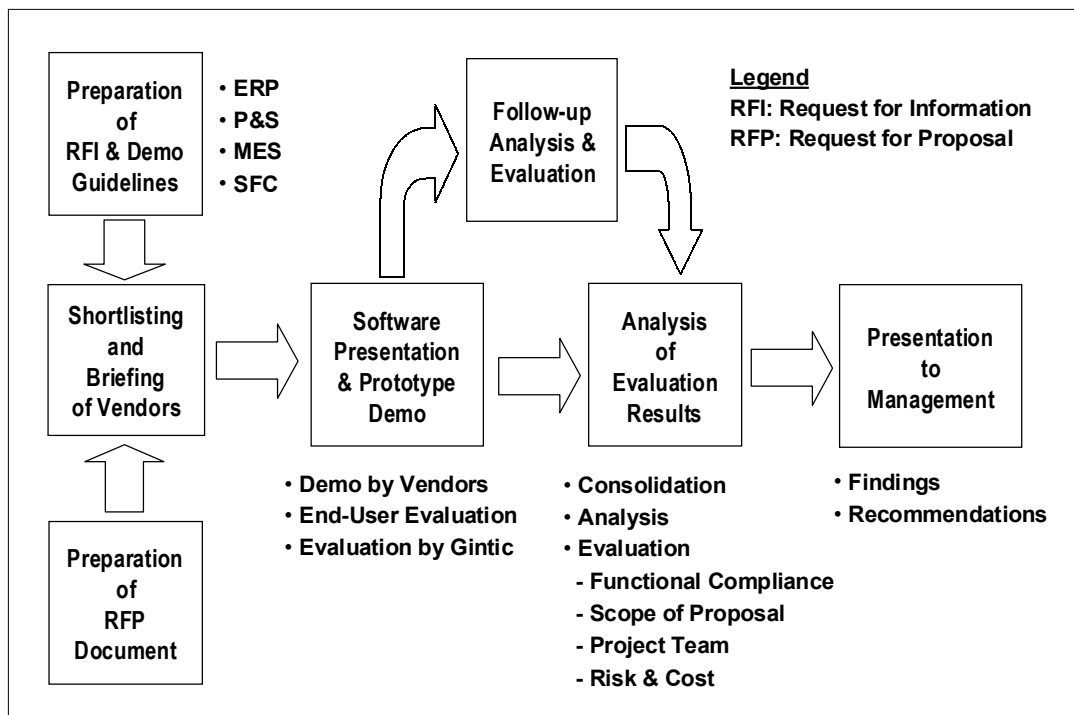


Figure 6: Stage 6 – Overview of Software Evaluation Methods

## 5 CONCLUSION

In this report we have briefly traced the progress of BPR in the 1990s and how we have extended it to cover business process reengineering beyond the strategic level to the tactical and operational levels of managing an enterprise.

A formalized methodology for carrying out business process reengineering has been developed. The primary objective of this methodology is to help companies to streamline their business processes according to the goals of each company.

The resulting reengineered business process-flow enterprise models are then used to benchmark and evaluate off-the-shelf enterprise-wide IT software to determine how well they fit to the enterprise strategies and goals.

## 6 INDUSTRIAL SIGNIFICANCE

It can be easily extended and applied to providing BPR services to companies which have the intention to implement complex enterprise-wide IT systems particularly those in the Semiconductor, Aerospace, Precision Engineering and PCB Fabrication industries.

In coming up with such standard methodologies, it will ensure that the business process reengineering efforts will at least meet a certain level of clients' expectations and quality of results. Furthermore, using the streamlined business processes as benchmarks against complex enterprise software will ascertain that the decisions made on future software investments are well informed and hence chances of successful implementation of the IT systems are greatly enhanced.

In addition, as a knowledge base, it can serve to rapidly proliferate the business process reengineering methodology and software selection techniques amongst BPR practitioners.

## REFERENCE

1. M. Hammer, "Reengineering work: don't automate - obliterate", Harvard Business Review, July-August, 1990, pp. 104-112.
2. T.H. Davenport, Process Innovation: Reengineering Work Through Information Technology, Harvard Business School Press, Boston, 1993.
3. N. Venkatraman, "IT enabled business transformation: from automation to business scope redefinition", Sloan Management Review, Winter, 1994, pp. 73-87.
4. Gartner Group Report, May 2000
5. Gartner Group Survey – Selected BPR Tool Vendors, 1997