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## THE ROLE OF INFORMATION TECHNOLOGY IN COLLABORATIVE BUSINESS RE-ENGINEERING

*Robert S. Putrus, PE, CMC*

### **Abstract**

This paper introduces a Business Re-engineering approach through information technology that enables companies to realize quantum benefits. The approach is based on a methodology that is easy to understand and execute, fast to implement, quantitative in nature, and sensitive to corporate politics. The first milestone of the approach is based on the development of the company business model in a workshop environment. The model consists of five (5) layers. These are Company Competitiveness, Company Business Objectives, Business Processes, Business Issues, and Company Initiatives. Each layer is defined by distinct components. The components of each layer are linked to the components of the layer above and below. The second milestone in the approach is to prioritize each component in each layer with understanding the impact relationship of each component on the layer above. In other words, the dynamic link and value of impacts are quantified by each of the company initiatives on the Business Processes, Business Objectives, and finally on the Company Competitiveness. The approach pictorially presents the translation of company strategy from strategic level down to tactical operational level. It describes the degree of impact of company initiatives on business processes and objectives. The process is accomplished through collaborative efforts of the team participating in the workshop. The approach introduces a forum that introduces initiatives with high information technology contents that are well rooted in the company business strategy. Also, the approach will provide assurance that company initiatives are understood, justified, adopted, supported, and can be implemented throughout the whole company.



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Each business function within the organization is represented in this forum and will contribute to the definition of the company business architecture and the ranking process to quantify the degree of impact of each attribute in such architecture. These business entities will propose, debate, compromise, and agree on the company's business model and its priorities.

The approach is a process that can assist company management in performing business analysis and justification based on company objectives and critical success factors. Management can make great use of this process by determining investment opportunity contributions, pay back and priority for each one of the business objectives. The outcome of this process serves as management guidelines for investment and allocation of resources such as investment capital and human resources. Also, this approach helps ensure that management has communicated and developed a consistent understanding of the company business objectives. The approach provides a communication tool as well as a structure for investment opportunities, business re-engineering and management aided decisions.



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## **THE ROLE OF INFORMATION TECHNOLOGY IN COLLABORATIVE BUSINESS RE-ENGINEERING**

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### **Introduction**

In today's business world (manufacturing, services, or any other) companies are faced with complex issues. The escalating demand of managing leaner businesses and producing more with less resources are great challenges. Complexity stems from external influences and internal elements of the business. Therefore, business planning and management demands a focused, creative and effective approach to view, simplify, analyze and conclude complex business challenges.

Presented below is an approach that is applied by individuals who are planning, managing businesses and making decisions based on the "whole". Little data is required as this approach is not interested in micro management.

There is no doubt that many managers who are concerned over the well being of their company's competitiveness would like to identify the business processes that help re-engineer their companies to realize quantum benefits.

It is a point of frustration for many corporate executives and operational managers that genuinely great and novel initiatives are presented by management teams never reach successful implementation.

Our companies are full of innovative ideas to improve and implement change. There is no lack of them. Matters of fact, companies are overwhelmed with new proposed innovative processes. What is lacking is the endorsement of their colleagues and support at all levels within the



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organization. More importantly, these business processes have to be linked vertically to company business objectives and architecture, i.e. translating these innovative initiatives from the strategic level down to the tactical operational level. Also, innovative initiatives must horizontally cut through the organization infra-structure where the impact is well disseminated. Most of these initiatives are dependent on information technology consisting of computer and network systems and application software

Within a corporate framework, re-engineering initiatives have an impact on the corporation as a whole. If a corporation adapts such initiatives, it has to ensure that the initiative is understood and supported by the organization and that impacts are vertically quantified.

It was elegantly articulated by Thomas Davenport that the identification and selection process for innovation is an important pre-requisite to process change.

This paper articulates the role of information technology initiatives as a means to business re-engineering approach of multiple outcomes ranging from the introduction of new initiatives, embracing, supporting, and implementing business processes and business enablers throughout the company. Business functions within the organization are represented in this forum and will contribute to the business model and definition of company dynamics. Also, these functions will propose, debate and negotiate what the company's priorities and business initiatives are.

This approach will apply to situations where competitiveness is examined, alternatives need to be evaluated, risks and benefits are analyzed, impact of planning and implementing new programs are quantified, conflicts are resolved, and implementation plans are prioritized.

### **Building Block**

The re-engineering process described in this paper is based on four attributes: Workshop setting, consensus building, development of company business architecture, and accepting the facilitating tool.



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Workshop Setting - A forum where a corporate structure is represented as the official entity of each of the operating units. The unit is represented by individuals who carry the credibility of understanding and discretion to propose, support and implement change.

Collaboration - All individuals participating in the workshop forum have to agree that the collaborative approach is the agreed upon rule in design and implementation of the process.

Development of Company Business Architecture - Business model representation of the company that describes the dynamic relationship of the company business objectives to the business processes, then to company faced challenges and to company initiatives. The dynamic impact of the re-engineering initiatives will be understood, supported, and justified.

Accepting the Facilitating Tools - The tool used in this forum is easy to use, not time consuming, can establish links between different layers of the business architecture, and a reliable ranking technique. The tool used is called "Analytic Hierarchy Process" (AHP).



## Re-Engineering Approach

The business re-engineering approach will be executed according to the following phases:

Phase Number	Description of Phase	Time To Commit
I	Present the approach to management and obtain initial support.	<b>2 hours (Management)</b>
II	Identify the team members participating in the business re-engineering workshop.	<b>4 hours (Management)</b>
III	Present the approach through a case study to the team members for their acceptance.	<b>3 hours (Team)</b>
IV	Conduct workshop in a location other than company premises:  A. Build company business architecture identifying layers of objectives, CSFs, Current Challenges, and suggested initiatives.  B. Prioritize all elements in each layer.	<b>1-2 days (Team)</b>
V	Facilitator prepares final report and presentation.	<b>2-3 days (Facilitator)</b>
VI	Present Findings.	<b>3 Hours (Team)</b>

### Case Study Presentation

The following will explain to the reader The Role of Information Technology in Collaborative Business Re-engineering in a case study presentation.

The case study is about a pseudo company called "BestCompany, Inc." which is trying to achieve "Competitiveness Through Serving The Technical Needs of The Clients". The model is intended to be used as an example, more than a true representation of BestCompany, Inc. or the industry that it is part.



## **Background:**

The process was conducted in a workshop forum facilitated by a management consultant. The participants were the President of BestCompany, Inc., VP-Sales and Marketing, VP-Engineering and Operation, VP-Information Technology, and VP-Finance.

The workshop was run on the basis of teamwork and the collaboration approach. The team collaborated to identifying and establishes the business architecture of the company and ranks every element of the model. Disagreements in views were resolved in the workshop room through debate, further analysis, compromise and finally consensus.

BestCompany business model was developed and elements were prioritized by using the "Analytical Hierarchy Process" method. The business model reflects the company's present status in the current market and industry condition. The business model should be revised upon changes of company status or any of these conditions.

## **Construction of The Business Model**

The Business Model of BestCompany was developed in a workshop setting where participants (recommended not to exceed 7) represent critical organization segments.

The Business model consists of five layers (refer to Figure 1. Business Model of BestCompany, Inc.) The definition of these layers and all of their elements are left to reader interpretation at this point. Emphasis should be heavier on the process and the approach and much less on the definition of each layer and/or elements of each layer left to the readers' interpretation.

These layers are as follows:

1. BestCompany Competitiveness Through Serving The Technical Needs of The Clients:  
This layer is derived from the mission statement of BestCompany.
2. Business Objectives:  
This layer represents the corner stone of the company establishment. These primary Business Objectives of BestCompany are:
  - Cost Control



- High Resources Utilization
- Longevity
- Expansion of Client Base

### 3. Business Processes:

These Business Processes are essential to achieve the defined company's Business Objectives. These processes have strategic and operational characteristics to achieve organizational strategy. The approach in identifying the business processes is subjective in nature, but the collaborative approach has the objectivity pull. The participants spent ample time in brain storming, identifying, and agreeing on the processes that are of most importance in achieving the company business objectives. Finally, they agreed that the selected essential Business Processes are:

- Deliver On-Time
- Comply to Budget
- Focus on Larger Projects
- Improve Customer Relationships
- Expand Through Acquisition

### 4. Business Issues:

This layer identifies the challenges facing BestCompany. Simultaneously, these are the factors hindering BestCompany efforts from realizing the Business Processes or enabling the company in achieving its Business Objectives and being positioned competitively. The group was able to identify the most critical issues they are facing. These Business Issues are:

- Resource Status & Availability
- Validating Estimates
- Timely Information
- Mobile Work Force

### 5. Business Enablers



These enablers are the opportunities BestCompany can implement to help contain the Business Issues facing the company. These initiatives enable the implementation of the company Business Processes. Furthermore, they will reposition the company competitively in the market place. The business enablers, identified by workshop participants, are not all technological ones. These enablers have a high content of information technology aspects. Business Enablers identified by the group are:

- Re-engineer Accountability and Performance of Business Units
- Implement Tracking System of Critical Resources
- Implement Group Networking Technology
- Develop Executive Information System
- Institute and Implement Standards in Company Practices

### **Establishment of Relative Impact and Priorities**

All layers are linked in hierarchical form. Each element in the business model can be expressed in a quantifiable fashion by all the elements in the layer below.

The participants in the workshop carry out, in a collaborative approach, defining the impact of all the elements in a given layer on each element of the layer above. It is the prioritization processes. As an example, the company objectives are prioritized by degree of impact that each of the business objectives has on "BestCompany Competitiveness" (refer to Figure 2. Detailed Breakdown of Priorities.)

As another example, the approach can quantify the impact or the relative importance each of the Business Enablers might have on any elements of the Business Processes or Business Objectives.

The prioritization was accomplished through the use of Pairwise Comparison Matrix techniques which is part of the Analytical Hierarchy Process (AHP) based on a scale of 1 through 9, where "1" represent Equal Importance and "9" represents Absolute Importance. (For further readings on AHP, please refer to the Recommended Readings.) In this approach, the prioritization and relative impact were further simplified for ease of understanding and interpretation.



## Data Interpretation and Use

The relative impact and the priority of Business Objectives on "Competitiveness Through Serving The Technical Needs of The Clients" (refer to Figure 3. Prioritized Business Objective) is as depicted:

- Reduce Costs : **Very High**
- High Resources Utilization : **Medium**
- Longevity : **Medium**
- Expansion of Client Base : **Low**

From the objectives breakdown, BestCompany, Inc. competitiveness is highly dependent on Reduce Costs. The attention of senior management must be highly focused on these business objectives.

If the management focus is on the overall competitiveness of BestCompany, the following are the findings of the relative importance of the Business Enablers:

1. Implementation Group Networking Technology : **High**
2. Develop Executive Information System : **Medium-to-High**
3. Implement Tracking System of Critical Resources : **Medium**
4. Re-engineer Accountability and Performance Measurement : **Medium**
5. Institute Standards in Company Practices : **Low**

The findings support the implementation of the investment opportunities in such priority that is consistent with the relative impact.

"Implementation of Group Networking Technology" has the highest impact and should be implemented first within BestCompany. Second investment should emphasize on the "Development of Executive Information System" to be used by company personnel.

"Implementation of Tracking System of Critical Resources" is nearly of equal importance to Re-engineer Accountability and Performance Measurement in its contribution to the competitiveness



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of the company. This approach enables management to prioritize business enablers implementation.

If Profitability is our only concern, then management attention must focus on the Business Processes of high impact on the Reduce Costs objective. This will be Compliance to Budget and On Time Delivery. Consequently, company investment in business enablers has to be implemented as such. Each opportunity has its own contribution to Reduce Costs, but Group Networking has the highest impact on this objective if compared with other business enablers. (Refer to Figure: Total Breakdown.)

Key Opportunities were prioritized with respect to BestCompany Competitiveness Through Serving The Technical Needs of The Clients (refer to Figure BestCompany Prioritized Solution.)



**Financial Impact and Return Of Business Enablers:**

The approach explained above can be extended to the financial justification of the Business Enablers. The justification process has an edge on other justification processes. It is highly based on the company business model, i.e. the impact such investment might have on each element of the company and on the bottom line, which is *competitiveness*.

Carrying out investment analysis of the "Implementation of Group Networking", as a business enabler, and using Productivity as one of the company business objectives can be confidentially understood and justified in an objective manner as shown below:

<b>Assumption</b>	<b>Opportunity</b>	<b>Results</b>
<b>A. Business Objective:</b>	<b>Utilization</b>	
Investment \$150K	Group Networking	High Impact (30%)
Revenue Per Billable Employee: \$100K/Year		
	Desired Utilization Improvement (over 3 years)	40%
	Overall Utilization Gain	12%
	Potential Return per Employee Based on Utilization Improvement	\$12K
60 Billable Employees	Potential	\$723K
<b>B. Business Objective:</b>	<b>Profitability</b>	
<b>C. Business Objective:</b>	<b>Longevity</b>	
<b>D. Business Objective:</b>	<b>Expand Client Base</b>	
<b>Total Return<sup>1</sup></b>	<b>Potential</b>	<b>\$723K+B+C+D</b>
<b>Conclusion:</b>		

<sup>1</sup> The total return will be left as an exercise for the reader



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This approach of The Role Information Technology in Collaborative Business Re-engineering depends greatly on management participation and support of such initiatives, experience and discretion of company management participating in workshop, the acceptance of reaching decisions via collaborative efforts in a management workshop forum, and the acceptance of the re-engineering approach. The credibility, accuracy, and results of this approach are highly dependent on more than one person participating in the workshop session and the areas of expertise of the participants. Detailed information is not required to carry out the analysis and conclusion of such re-engineering approach. The approach is a process that can assist company management in performing business analysis and justification based on company objectives and business processes. Management can make great use of this process by determining investment opportunity contributions, pay back and priority for each one of the business objectives. The outcome of this process serves as management guidelines for investment and allocation of resources such as investment capital and human resources. Also, this approach helps ensure that management has communicated and developed a consistent understanding of the company objectives. The role of information technology in collaborative business re-engineering provides a communication tool as well as a structure for investment opportunities, business re-engineering and management aided decisions.

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**Competitiveness  
 Through Serving  
 The Technical Needs of The Clients**

**Business Objectives:**

Cost Control (CCO)	High Utilization (HIU)	Longevity (LON)	Expand Client Base (ECB)
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**Business Processes:**

Deliver On Time (OTD)	Comply to Budget (CTB)	Larger Project (LPR)	Improve Customer Relationships (ICR)	Expand Thru Acquisition (EAQ)
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**Business Issues:**

Resource Status & Availability (RSA)	Validated Estimates (VES)	Timely Information (TIN)	Mobile Workforce (MWF)
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**Business Enablers:**

Re-engineering Accountability (REA)	Resource Tracking (RTR)	Group Networking (GNT)	Standard Practices (SPR)	Exec. Inform. Systems (EIS)
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**Figure 1. Business Model of BestCompany, Inc.**



### Competitiveness

#### Business Objectives:

		Cost Control (CCO) [50]		High Utilization [26]		Longevity (LON) [17]		Expand Client Base (ECB) [7]	
	<i>OTD</i>		30		25		5		25
REA	<i>CTB</i>	16	35	16	25	15	15	16	20
RTR	<i>LPR</i>	19	20	19	30	22	30	20	10
GNT	<i>ICR</i>	30	10	30	10	30	15	30	15
SPR	<i>EAQ</i>	13	5	13	10	13	35	13	30
EIS		22		22		20		21	

#### Business Processes:

		On Time Delivery (OTD)		Comply to Budget (CTB)		Larger Project (LPR)		Improve Customer Relation (ICR)		Expand Through Acquisition (EAQ)	
	<i>RSA</i>		35		25		35		20		40
REA	<i>VES</i>	16	30	16	35	17	25	15	30	16	10
RTR	<i>TIN</i>	20	25	17	30	20	35	17	35	23	25
GNT	<i>MWF</i>	30	10	30	10	31	5	30	15	31	25
SPR		13		14		12		14		12	
EIS		21		23		20		24		18	

#### Business Issues:

	Resource Status & Availability (RSA)	Validated Estimates (VES)	Timely Information (TIN)	Mobile Work Force (MWF)
REA	20	15	15	10
RTR	35	5	15	20
GNT	30	25	35	30
SPR	10	20	10	15
EIS	5	35	25	25

#### Business Enablers:

Re-Engineering Accountability (REA)	Resource Tracking (RTR)	Group Networking (GNT)	Standard Procedures (SPR)	Executive Information System (EIS)
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Figure 2. Detailed Breakdown of Priorities

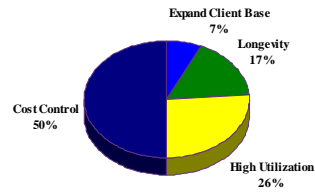


Figure 3. Prioritized Business Objectives

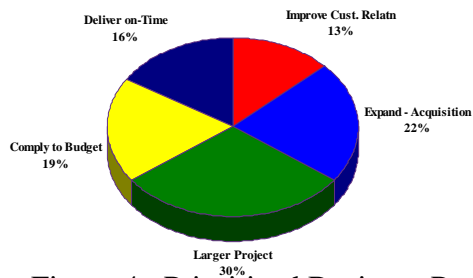


Figure 4. Prioritized Business Processes

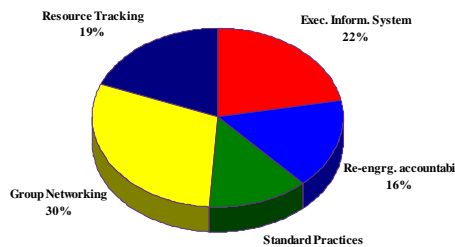


Figure 5. Prioritized Business Enablers

**Recommended Reading:**

Putrus, R.S. "Accounting for Intangibles in Computer Integrated Manufacturing," *CIM Review*, Volume 6, No. 2 (Winter 1990), pp. 23-29.

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