

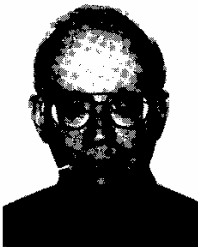
Reengineering: Dangers and caution needed

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Most organizations today are not in need of reengineering their business or operating processes. They are more in need of reengineering their managerial orientation; introducing the right managerial approaches will lead to substantial improvement on the existing base. These organizations would be well advised to adopt a competitive strategy and operate on the basis of the three-stage model, with its promise of success at low risk and minimal investment.

The small percentage of organizations (mostly large ones) at the point where their business strategy obliges reengineering focal processes or the business as a whole, would do well to first change their managerial perception by taking a global perspective of the organization, focusing on the essential, and using simple tools. By adopting proven methods such as changing traditional cost accounting procedures and adopting global performance measures, Just In Time, the Theory Of Constraints, the Complete Kit concept, and improving quality, the organization will make short-term gains. In this way, those involved in simultaneously planning reengineering the organization, will be better acquainted with the processes, the market and the people performing the organizational functions.



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1. Introduction

- Would you be prepared to consider improving the performance of your organization if it meant rethinking your entire system of business processes?
- What would be your response if the proposed managerial approach promised you dramatic improvement?
- Would your response still be positive if you learned that 50-70% of the organizations that implemented the approach failed to achieve improved performance?

The ever more popular managerial approach embodied in these questions has become the buzzword of the 1990s – reengineering, or more appropriately, Business Process Reengineering (BPR). Its main problem is simultaneously setting a very high threshold and a high level of risk.

2. What is reengineering all about?

Reengineering is an approach to improving organizational performance developed by Hammer and Champy [5], who define it as 'the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed'.

2.1. The need

In common with other managerial approaches, reengineering is meant to provide an answer to the basic problem of today's business organizations – adapting to the acute transition from a sellers market to a buyers market. Making the transition to a buyers market, with all that this entails, i.e., catering to the needs of the customer, is not simply a matter of adapting to a passing fad. The macro-economic changes of the past two decades that have brought about the excess of production and development capacity, resulted from a number of trends:

- The entry of new players into the market – the seven ‘Asian tigers’ (Korea, Singapore, etc.).
- The communications revolution – the global availability of information and a more perfect market.
- Globalization – the world as a global village – without borders, and with a minimum of tariffs, a world of cooperation and joint ventures.
- The ending of global military conflicts and the channeling of the means of production from defense to civilian industries.

These and other factors have brought about the transition from a market controlled by sellers to one in which the customer is the focus of attention, the battle over the customer’s decision to make a purchase taking place in four arenas: price, lead time, quality, and performance. To enable the manufacturing and service organizations to survive in this battle for the consumer’s custom and improve their competitive edge, numerous managerial approaches have been developed that are designed to help them sell their products at competitive prices, reduce lead times, improve quality, and adapt product performance to the needs of the consumer [10, 11].

The approaches that have so far been adopted in the developed world, have been evolutionary – Just In Time (JIT), the Theory Of Constraints (TOC), Total Quality Management (TQM), the Complete Kit concept, and Global and Effective Performance Measurements (GEPM) approaches for better costing, measuring and control; they have brought about significant improvement without causing massive upheavals in the organization [9]. Reengineering, which aims at creating a breakthrough by different means, is, by contrast, revolutionary.

3. The essence of reengineering

Reengineering consists of four basic components:

1. *Fundamental.* Reengineering requires a change in basic premises. The practice of checking a customer’s credit rating, for example, might be questioned; perhaps the insurance agent could issue the policy in the presence of the customer at the conclusion of the initial meeting.
2. *Focusing on processes.* This is not really a new concept; all the new approaches to management view the process in general and the business process in particular as the backbone of the or-

ganization. Reengineering focuses on processes that are relevant to the entire organization, rather than one functional department or another.

3. *Radically redesigning the processes.* Reengineering holds by the notion of reconstructing the business process rather than improving the existing process. In the words of Champy and Hammer [5]: ‘... reengineering is about business *reinvention*, – not improvement, business enhancement, or business modification’.
4. *The desire for a dramatic new departure.* Reengineering does not set itself the goal of improving throughput by 10% or 20%; it aims for three-figure improvement, for the giant step forward in organizational performance.

4. Why did reengineering emerge precisely in the 1990s?

The desire for a radical change that would lead to impressive achievements was born out of the need to survive in a keenly competitive market. The reengineering approach is an attempt to exploit the potential of the technological developments of the last decade to achieve a solution. It attempts to exploit the giant step taken by information technology, communications and automation in making a significant breakthrough in organizational performance.

In the TOC, JIT, TQM, and other management theories, philosophies, techniques and tools, the emphasis was on the managerial facet. Reengineering brings the new dimension of technology into the equation, according it a central position. Without the information revolution and the technology revolution, reengineering would not have been possible. Technology is the necessary condition for reengineering, with all its financial, organizational and managerial implications.

5. The implications of reengineering

The following trends emerge from a review of the organizations in which reengineering did indeed enable a giant step forward to be made – 30% of all those that tried [5]:

- a) *Reconstruction as a client-focused organization.* Insofar as today’s main constraint is the market, all of the organization’s processes are of necessity client focused.

- b) *Reduction of middle management.* The ranks of middle management are being reduced as many elements of the management hierarchy become redundant following the information revolution.
- c) *Reduction of control and coordination.* Reengineering calls for less control, less coordination, less liaison personnel, paperwork, etc.

The results reported by organizations that have successfully undergone reengineering generally speaking show a dramatic reduction in lead times, a moderate rise in throughput, and a dramatic reduction in manpower. At the same time, they show a rise in investment in information technology and automation.

6. The dangers inherent in reengineering

a) *The process is irreversible.* Too often, a failed reengineering results in irreversible damage. Consider, for example, an organization reengineering the process whereby it produces the main goods or services it provides to its clients. Reengineering this process is meant to reduce lead time by 90%, and the reengineered process will employ 30 workers instead of the 50 it employed previously. What will the organization do if the project fails? What will happen to the clients in the meantime? Will the 20 middle-level managers fired in the reengineering process return to their jobs?

Under managerial approaches such as JIT, TOC, the Complete Kit, TQM, and GEPM, most of the changes are reversible and can be corrected. Thus, for example, most of the organizations that decided to reduce lead times have also changed the method of measuring, have usually reduced production lot size, have reduced setup time, work with complete kits, and so on. In this way, many organizations have achieved fivefold, tenfold and twentyfold reductions in lead time. Let us now suppose that the organization has failed in its reengineering effort, and that problems have arisen in making the shift from a lot size of 1000 items to one of 100 items (with the intention of reducing lead time by 90%). The way back to lead times improved by 50% or to the initial lead times – by changing lot size – is still open, and the cost of failure is low.

b) *The human facet.* As noted above, for the most part, after reengineering the organization remains with fewer employees and less middle management. Not unnaturally then, difficulties are encountered in gaining the cooperation of the employees to embark upon a venture that is likely to threaten their livelihood.

c) *The results do not lead to a breakthrough for the organization as a whole.* The foundation of success in the competitive world is wise business strategy. Reengineering a business or process that does not emanate from overall strategic thinking will yield only partial business success, even if it leads to reduction of costs and lead times, or a significant improvement in quality. Reengineering a business process in isolation from the overall strategic context is likely to leave the organization in its pre-reengineering state, and thus to a loss of competitive advantage.

6.1. Who is in need of reengineering and when?

Firms reaching the stage of being in need of reengineering are usually described as being on the verge of catastrophe or fast approaching it, or as those wishing to make a giant leap forward to compete successfully in the market place. Beyond the flowery language, the following facts emerge from careful examination of the organizations that have attempted reengineering.

1. *Size of the firm.* The overwhelming majority of firms embarking on the process of reengineering are large or medium sized, by American standards [4]. The literature is full of examples of success stories of firms such as Hallmark, Ford, Tacho Bell, Capital Holding, Bell Atlantic, Navistar, and Procter & Gamble.
2. *The use of advanced technology.* In all the analyses carried out, the use of information technology was essential for the firm's existence and survival, or for creating competitive advantage.

The need for reengineering is greater in large firms, and it is generally essential if the business strategy requires a technological revolution to achieve strategic goals quickly.

7. What is to be done?

Because reengineering integrates managerial processes with advanced technology, it is suggested that it be carried out in the following stages.

7.1. Determine a business strategy for the organization

The business strategist examines the organization's weaknesses, strengths, the business opportunities open to it, and the threats with which it must contend. Com-

petitors, customers, and the business, political and legal environment are examined in an effort to delineate a strategic path that defines focal points and the means of achieving the goals that have been set. Not every business strategy is based on a scorched earth policy. On the contrary, changes in the existing structures usually bring strategic advantage to small and large organization alike, without radical change or unnecessary risk.

The strategy planner examines the competitive dimensions that need to be changed, and the extent to which they have to be changed. For example, in some communication projects markets, in which the lead time of the competing firms stands at 30 days, it is estimated that a firm offering a lead time of 15 days will have a competitive edge; thus it is not necessary to reengineer the business to a lead time of three days. Then again, in a market in which the customer's expectations are a reject ratio of 15 ppm (parts per million), it is not necessary to reengineer to 15 ppb (parts per billion), unless of course this serves or is perceived to serve as the firm's clear and leading strategic advantage.

This phenomenon of over-reengineering emanates from the desire of the technology people to exploit the technology to the maximum and to create the best possible process – born before its time. It is dangerous and likely to boomerang.

Strategic analysis may result in recommendations for radical action requiring change and additional information technology; alternatively, the recommendation may be the implementation of improvements that do not require reengineering. We will now discuss these two cases separately.

8. When there is no need for reengineering

8.1. Proceed according to the 'three-stage model' [9]

A. Improving business operations systems

The tools available are non-risk sellers tools that are capable of leading to a breakthrough [1]: Just In Time, the Theory Of Constraints [3], the Complete Kit [7], and GEPM approaches. These are powerful tools for attaining results in the short term (12 to 18 months), particularly in processes concerning the flow of information, materials, goods and services. Indeed, reducing lead times by 50–70% through the use of these tools is nothing unusual these days [2, 11, 12]. Chang-

ing the performance measures of the organization and its departments, and changing its transfer pricing policy are leading to tens of percentage points of improvement in overall performance [6]. Hundreds of organizations have benefitted from these implementations in recent years. Changes in costing and pricing, as well as the breakaway from classical-traditional costing are yielding good short-term results. These tools lead to a simplifying of the processes, which, in our opinion, is a prerequisite for computerization and the entry of technology [8].

This is the stage at which reengineering of the concept of management is carried out. Success ratios are very high at this stage and results are obtained without investment in equipment and technological infrastructure. The important factor here is 'changing the managerial diskette', i.e., reengineering the managerial perspective to make the transition from a local to a global perspective, from blanket bombing to focusing on main issues, and from complex tools to simple heuristics.

Only a small number of managers is actively involved in this stage, though more are involved passively. A substantial return is achieved by concentrating managerial efforts, particularly among top and middle management.

B. Improving quality and processes

Upon achieving results in improving the business systems, attention is turned to the processes, particularly to improving quality. This difficult stage yields intermediate-term results. Here, we are talking about the classical tools of quality management, team work and using the 'magnificent seven' tools. Many workers and middle management cooperate actively in this lengthy and arduous stage.

C. Strategic changes and strategic ramifications

After setting stages A and B into motion, when significant results are beginning to appear (particularly in improving the business systems), the strategic gains of the benefits attained may be extracted. Improving business systems, quality and systems usually leads to significant tactical improvement, which is translated here into strategic improvement. For example, drastically reducing inventories and cutting the costs of poor quality can enable entry into an existing market segment (differentiated into a new market segment) in which the product can be sold at a lower price. Reducing lead times can serve the marketing and sales people in creating a strategic advantage.

9. When there is need for reengineering

When the business strategy dictates reengineering, the three-stage model is applied in a slightly different manner, carrying out the following two processes in parallel:

- a) setting up a reengineering team;
- b) improving the business systems and improving quality and processes, according to stages A and B of the three-stage model.

The reengineering team will work together with the business strategy people in defining the new processes and their content. This work, which has to be done at the top management level, usually takes a year to a year and a half to complete. Applying the concept is likely to take at least another year. And what is the organization to do in the meantime, one may ask; it can hardly be expected to wait and see how the competition reacts. The only answer is to work towards improving its existing systems using tools that do not cost much but bring about significant improvement in management – at the business operations systems improvement and the quality and process improvement stages. These activities will carry the organization over the two to three years till the radical change is implemented, and will provide better insight into and understanding of the analysis process of the reengineering framework, which will reduce the risk substantially.

10. When is it advisable to use the reengineering approach?

Reengineering formulates a methodology, a method and tools for implementing a new technology with maximum impact. Introducing a new technology into an organization (information systems, equipment, CAD/CAM – Computer-Aided Design/Computer-Aided Manufacturing, etc.) is no easy matter, and the failure rate (particularly for manufacturing systems) is in the range of tens of percentage points [8]. Reengineering integrates the approaches of quality management – that is, the teams work together in applying the methodology and concept of a new technology. The result: new ideas creatively generated by the interaction among the team members, dedication to the objective and the absence of opposition to change.

In this case of introducing new technology it is recommended to start the teams working on the reengi-

neering project only after the organization's top management and the members of the teams have acquired the managerial knowledge to enable them to make informed distinctions among the technological alternatives. This managerial knowledge is included in the managerial approaches described above.

Appendix 1. The case of the airline company [5]

An airliner belonging to an airline company was grounded for repairs at airport A. The nearest available mechanic worked at airport B. His supervisor refused to send him to airport A, because it meant that after finishing the job he would be obliged to spend the night at an hotel in the vicinity of airport A, at a cost of \$100 (!) which would be charged to airport B. To avoid this added expense, the mechanic was sent the next day to repair the airliner, which remained idle for a day. The cost of chartering a replacement airliner at peak time is several thousand dollars a day!

A non-reengineering solution

It is immediately clear that using the tools of GEPM and the change of traditional cost accounting and transfer prices, within the framework of stage A of the three-stage model, will lead to a substantial change [9].

Appendix 2. The case of IBM Credit [5]

IBM Credit is a subsidiary of IBM dealing with the financing of computers. The process of financing and its authorizing is as follows:

- A sales representative requests financing.
- The request is registered.
- Credit quality is examined.
- The contract is prepared.
- Prices are estimated.
- The interest rate is calculated.
- The proposal is formulated.
- The proposal is dispatched to the sales representative.

Total time: 6 days.

The reengineering solution

IBM Credit replaced the credit examiners, price estimators and others with non-specialized workers. A newly defined 'underwriter' was entrusted with the job of dealing with the request in its entirety. A single database was constructed and a sophisticated new computerized system was developed. Lead time was reduced to four hours. 'The breakthrough: IBM Credit exploded the myth that it takes experts to perform steps that require expertise' [5].

The non-engineering solution

In our view, IBM Credit should have defined the strategically required lead time and constructed a process that allowed it to be met. It is possible that a lead time of four hours still results in business losses, particularly in the case of a client interested in closing a deal on the spot. Segmenting clients according to their needs and Pareto dividing the orders [12], within the framework of the three-stage model, would have accommodated clients wanting an immediate response, and provided other clients with a different lead time, attainable even through an electronic spreadsheet or other simple tools.

Appendix 3. The case of the Kodak company [5]

In 1978, Fuji, Kodak's big rival, announced the launching of a disposable 35 mm camera. Kodak had no answer to this product. Instead, with the help of CAD/CAM technology, and applying concurrent engineering, Kodak reduced its time to market from 70 weeks to 38 weeks.

The non-reengineering solution

The analysis following our view would have led to the following implementation.

a) *Determining strategy.* In response to the competitive threat posed by Fuji, Kodak should have defined the product, the market, the quality, the performance, the price and the lead time, and embarked upon a development process that would meet market requirements.

b) *The three-stage model.*

1. *Improving the business systems.* The primary need is for reengineering of perception and perspective amongst the scientists and engineers – from a technology orientation to a marketing and management orientation; instead of striving to

create the best possible product, they must perceive their objective as meeting the needs and expectations of the client. Within this 'diskette-changing' framework, every scientist and engineer in the team will undergo a process of reorientation by the end of which over-specification and over-design will be perceived as undesirable. At this stage, the just in specification approach (the development equivalent of just in time) will be implemented, to identify the system constraints (veteran engineers, team leaders, and very often program engineers and system engineers), to measure the development in relevant parameters and to specify a complete kit in the development context.

2. *Improving quality and processes.* Specifying the quality of development will lower the development scrap heap and reduce the number of cycles.

The implementation of these two stages is a managerial change in the perception of the scientists and engineers. Introducing CAD/CAM technology without the necessary managerial infrastructure and with no change in the perception of managerial processes will lead to an unsuitable product, with many cycles, but it will be done more quickly and more efficiently. Getting the most out of the technology, and successful implementation of integrated engineering is preconditioned on a change in perception within the framework of improving business systems and improving quality and processes. Good specification of the equipment required emanates from the global perspective of identifying bottlenecks, which is carried out at these stages.

3. *Strategic implications.* The strategic implementation of CAD/CAM and the change to an integrated engineering approach must be compatible with the firm's overall strategic goals, and not just an isolated radical improvement.

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