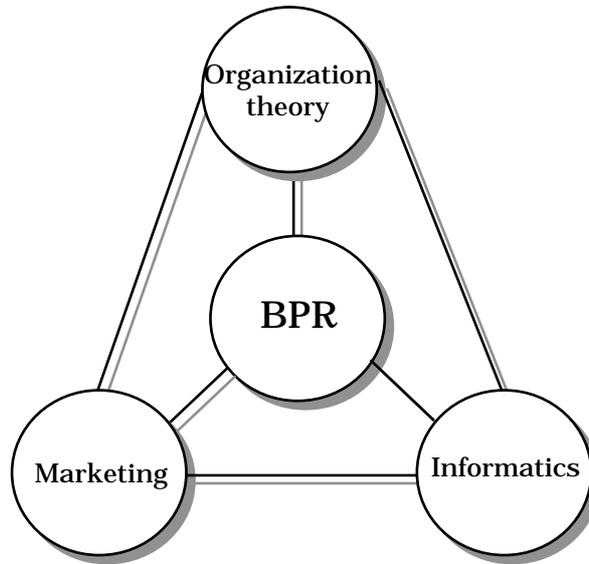


# Towards a theoretical framework for Business Process Reengineering



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## Abstract

Business Process Reengineering has gained a considerable attention in the world of change management during the past years. While more and more organizations embark on the BPR trend it can be concluded, that the theoretical bedrock for BPR falls rather short of the concepts ambition of being a solution for a multiplicity of problems that many companies suffer from.

This thesis is intended to provide a theoretical framework for BPR by linking the concept to existing theories within marketing, organization theory and informatics.

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# **1. Introduction**

## **1.1. Intention of this thesis**

For many companies, the competitive field has been reshaped significantly during the past years. The globalization of markets [OXELHEIM93], the current economic recession, new customer requirements for product- and service quality, and the rapid development of information technology (IT) [WINTER90] require new strategies for successful enterprising, as well as new methodologies and tools for system analysis and -design in dynamic environments.

Many leading companies have therefore launched large-scale efforts to deliver greater customer value by "reengineering" their businesses, "customerizing" their business processes and using IT as an enabler for gaining competitive advantage [MANGANELLI93]. Beyond that, all changes have to be performed in respect to the aspects of "Total Quality" [MACCOBY93]. As the advocates of BPR claim it may, if done well, deliver extraordinary gains in speed, productivity, and profitability. In their striving for competitive advantage, reduced costs and increased profitability [HAMMER93], more and more companies are embarking on this trend.

But, business process reengineering is neither simple nor intuitive. As many managers are discovering, reengineering usually brings with it major problems and, often, failure. A recent survey of chief information officers showed that reengineering projects consistently fall short of their expected benefits [BELMONTE93, MOAD93]. It is estimated that between 50% and 70% of reengineering efforts fail to achieve the goals set for them and figures from evaluations of TQM indicate the same results [STEWART93].

Even though impressive results have been achieved, the high rate of failure leads to an immense waste of resources in many organizations. This waste might be avoided, if change agents would gain genuine knowledge about the concept they are struggling with. According to my opinion, the reasons for failure can be found in the following areas:

- 1) BPR has no solid theoretical bedrock.
- 2) The methods used may be inadequate.
- 3) Projects are performed inappropriately.

There is no fact speaking for Swedish companies being immune against BPR project failure. It is therefore highly necessary to direct research efforts towards this area, intended to provide guidance for companies struggling with BPR projects, and preventing them from falling into potential pitfalls, repeating errors done before and gaining their experience by costly trials and failures. The intention of this thesis is to take a first step into this direction and to provide guidance for organizations willing to initiate reengineering projects, or having them under progress, but having limited knowledge about what reengineering is. I will identify and describe the background theories, that BPR is deduced from and relate them to the concept of BPR. However, the theory analysis will not be based on current books, but on "classics" in the area of administrative science, in order to identify the real sources of BPR.

## **1.2. Method and Approach**

### **1.2.1. Literature Search and Results**

A first, brief review lead to the conclusion that Business Process Reengineering can be considered as a combined application of theories and and concepts from mainly three areas<sup>1</sup>:

- (1) **Marketing**, in the concern of competitive advantage, customer focus, industry value value systems and value adding chains.
- (2) **Organization theory** in the broad sense, including the aspects of Human Resource Management and organizational strategies.

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<sup>1</sup>The author is currently involved in a discussion, whether process design itself can be considered as being a fourth relevant theoretical area. The discussion can briefly be summarized as following:

The origin of process-thinking and -design can be found in the area of industrial engineering, where it evoked as a result of the industrial revolution in the end of the 19th. century. Process thinking has been adapted to administrative science in the 1930s and has been a part of it ever since. The question is now, if process thinking, as used in BPR, can be deduced from administrative science, or if industrial engineering, due to being the original source, has to be added as a fourth area. The author's own opinion is deducability of process thinking in organizations from administrative science, but many practitioners, especially from the engineering field, propose process design as the fourth relevant area.

- (3) **Informatics**, the use of IT for supporting process-based organizations by using appropriate information-architectures and -systems.

The identification of relevant literature was based on the premise, that BPR can be deduced from the three areas stated above. The literature search consisted of four steps, where step one was used as a basis for performing steps 2-4:

- (1) Collecting actual literature on BPR.
- (2) Collecting literature on relevant aspects of marketing theories.
- (3) Collecting literature on "classical" organization theories being relevant for the development of a theoretical framework on BPR.
- (4) Collecting literature on the links between BPR and the use of IT.

In 1958, March and Simon [MARCH58] stated

*"... that there is in the literature a great disparity between hypothesis and evidence. Much of what we know or believe about organizations is distilled from common sense and from the practical experience of executives. The great bulk of this wisdom and lore has never been subjected to the rigorous scrutiny of scientific method. The literature contains many assertions, but little evidence to determine - by the usual scientific standards of public testability and reproducibility - whether these assertions really hold up in the world of fact."*

The literature search on the topic Business Process Reengineering, as well as on the related issues indicated, that March's and Simon's statement has lost nothing of its actuality.

### **Literature on BPR**

Due to the actuality and the american origin of the BPR, literature on the phenomenon had to be searched in databases mainly containing journal articles, published during the past five years in the USA. A quest in the ABI/INFORM database, performed in Feb 94, revealed a number of 379 articles, using the keywords "business" and "process". The keyword "reengineering" was not used due to the fact, that many authors either use the term "redesign", or

they differ in spelling "reengineering". It can generally be stated, that the use of terms differs significantly, a fact that can be deduced from the newness and the currently non-existent theoretical bedrock for BPR. The following list includes some of the terms used as synonyms for BPR:

- Business Reengineering
- Business Process Reengineering
- Business Process Redesign
- Business Process Improvement

A selected reading of the abstracts of the revealed articles, combined with a briefing of other "hot topics" in the area identified a number of terms that were used for performing sub-quests on the list. Chart 1.1. shows the number of occurrences of the keywords used in the sub-quests. The following terms were used:

- Information technology (IT)
- Workflow
- Architecture
- Virtual (organizations)

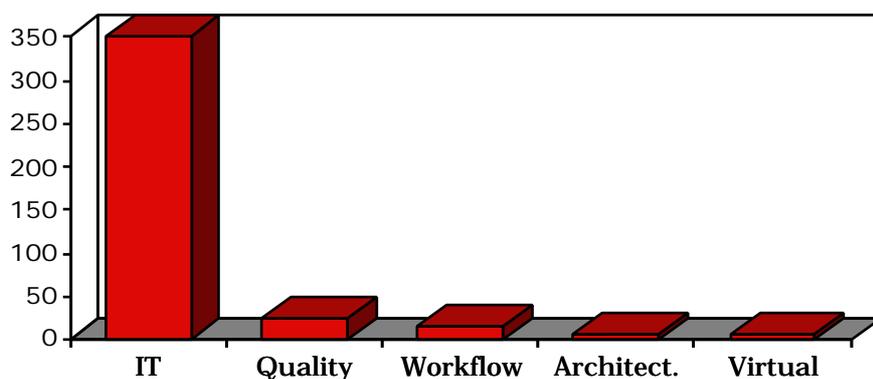


Chart 1.1.

Surprisingly enough, only one of the terms (IT) showed a significant occurrence. The others, even though frequently used by academics and practitioners, occurred rather seldomly.

A reading of the abstracts of all 379 articles revealed, that the literature on BPR, as far as articles contained in the ABI/INFORM database are concerned, is dominated by two types of papers:

- (1) Case studies of successful BPR projects (about 50%).
- (2) Articles describing and advocating the concept (about 40%).

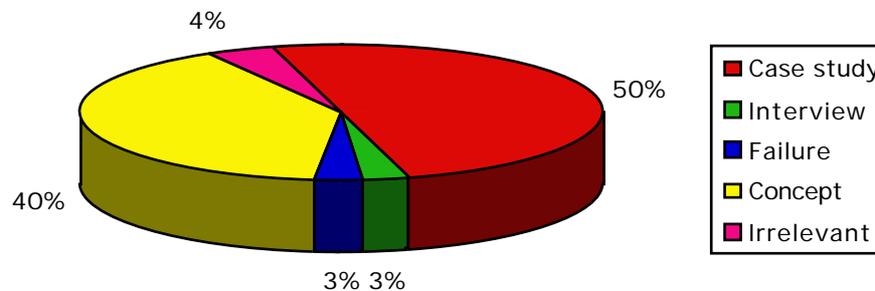


Chart 1.2.

The remaining 10% of the searched articles were either irrelevant, i.e. they were not discussing BPR, or they contained book reviews (mainly "Reengineering the Corporation" by M. Hammer & J. Champy) and interviews with famous "reengineers" (mainly Michael Hammer). A critical approach, or the description and analysis of failed projects, was found in 5 articles of totally 379.

Additionally, a number of articles from "unscientific" sources, i.e. magazines like "Business Week" and "Industrial Engineering", as well as the following books on BPR, or related concepts, have been used in this work:

- *Reengineering the corporation*, by M. Hammer & J. Champy
- *The virtual corporation*, by B. Davidow & M. Malone
- *Business Process Improvement*, by Tom Davenport

### Literature on Marketing

BPR focusses on the need of considering customer needs and requirements, as well as on "value-adding" as the major factors for determining business processes (even called "process-customerization" in current literature). M. Porter was a major contributor to this area and one of his his publications was therefore used as basis for integrating marketing aspects into the BPR framework.

- *Competitive Advantage: Creating and Sustaining Superior Performance*, by Michael Porter

### **Literature on organization theory**

BPR focusses, as far as the consideration of organizational aspects (including the issue of human resources) is concerned on the following aspects among others:

- Theories on departmentalization
- Organizational culture & power
- Organizational complexity
- Organizational change
- Human resource management

For identifying the original sources of the theories dealing with this issues, a "backtracking" approach was used. Current literature was scanned for the topics and by using their references as next level for further searches, the following publications were finally identified as being "original" sources:

- *Organizations*, by James March & Herbert Simon
- *Papers on the Science of Administration*, by L. Gulick & L. Urwick
- *Organizational Structures*, by Kenneth Mackenzie
- *Organization Design*, by Jay Galbraith

From these books, relevant chapters were extracted and used as a basis for the theoretical framework on organization theory. In addition, other writings, referred to in the books above, were considered.

### **Literature on informatics**

The literature on Informatics was chosen with respect to the rapid development of IT during the past years. Technological aspects were considered even in early writings, but have to be seen in the context of the "state-of-the-art" of the decade when being published, which makes many early foundations rather inactual today.

Therefore, the literature search on IT was focussed on writings published between 1980-93, paying special attention to articles relating BPR and IT. Due to the fact, that IT-use is a major aspect of BPR,

most of the articles revealed in the database quest on BPR had to be considered. The books on Informatics having been used were:

- *Management Information Systems*, by Gordon B. Davis
- *Strategic Planning for Information Systems*, by J. Ward et. al.

### 1.2.2. Relating BPR to theories

The BPR concept is, as it has been mentioned above, an integration of theories from a multiplicity of disciplines. A multidimensional approach, considering the premises and assumptions from all three areas had therefore to be used. However, interdependencies are not only found between BPR and each of the theoretical areas, even the source areas are highly interrelated and can not be considered as single entities, but as a network of theories, together building a theoretical bedrock for the BPR concept.

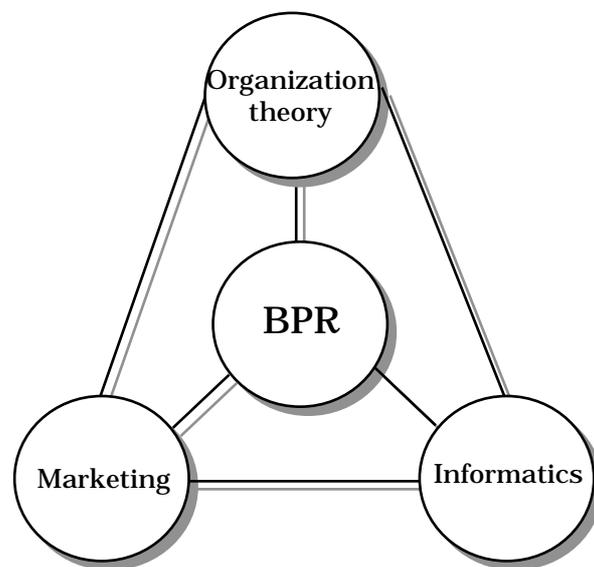


Fig. 1.1

### 1.3. Disposition

#### Chapter 2

Chapter 2 gives a brief introduction to the BPR concept, based on firstly Michael Hammers book, and secondly on several journal articles.

#### Chapter 3

In this chapter, BPR will be related to the theories from the areas having been defined as being relevant: Marketing, Organization theory (including the human factor) and Informatics .

#### Chapter 4

In the final chapter, the theories described in chapter 3 and the BPR concept itself will be critically discussed and some general conclusions will be drawn.

## 2. What is business process reengineering?

### 2.1. Michael Hammer's definition of BPR

According to Michael Hammer, one of the BPR gurus and founder of the term itself, BPR is

*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.* [HAMMER93]

This definition is one of the most cited ones and can be found in a considerable number of journal articles.

Furthermore, Hammer considers four keywords within that definition as being the most relevant ones, as there are:

- **Fundamental**

Two questions are considered as being fundamental and are addressing the companies justification of existence: *What are we doing?* and *Why are doing so?* As Hammer points out, forcing people to question the way they do business leads to rules turning out to be obsolete, erroneous and inappropriate. Reengineering means starting from scratch, no assumptions given and no current fact accepted and determines firstly what a company has to do, and secondly how to do it.

- **Radical**

Radical redesign of business processes means getting to the root of things, not improving existing procedures and struggling with sub-optimizing. According to Hammer, radical redesign means *disregarding all existing structures and procedures and inventing completely new ways of accomplishing work.*

- **Dramatic**

Reengineering is no way for achieving marginal improvements and fine-tuning. It is intended to achieve *heavy blasting.*

- **Processes**

Process-orientation is considered as being the most important aspect of BPR. Hammer claims, that most companies are focussed on tasks, people and structures rather than processes.

Despite this rather populist definition, the following paragraphs will provide a more humble definition of the BPR-concept and a brief description of a sample methodology.

## **2.2. The history of reengineering**

As it has been mentioned, BPR focusses on redesigning work processes to enhance productivity and competitiveness. The demand for a new approach to company restructuring has been fueled by the awareness, that many of the existing business logic is built on premises of considerable age. These existing processes were first designed as a set of sequential manual procedures, and then automated parallel with the accelerating development of technology. However, this automation did not change the strong efficiency orientation pushing for optimizing procedures or functions and a maximum level of control, neither did it adress the organizational externalities, such as customer demands. As organizations grew, more people were added and procedures were quick-fixed, while the organization of work still followed the original logic.

The development and application of information technology seemed to be a solution to that problem but, in fact, it was very often used to achieve short-term improvements of existing, and fragmented, processes. As Guha et. al. [GUHA93] point out, *this localized, incremental approach has created extremely complex processes that contribute little to the overall effectiveness of companies operating in today's business environment.*

Due to the the global changes in economy, markets are globalized, customer requirements change and competition is intensified, new approaches had to be developed for coping with environmental dynamics and the required flexible organizational change. In 1991, Michael Hammer, a former MIT professor in computer science published an article in the Harvard Business Review, emphasizing the

need for fundamental organizational change and for the first time using the term Business Process Reengineering.

Since then, the concept has been widely spread and applied, the publications of books and especially journal articles increases enormously and more and more conferences are hold on the topic.

It can be estimated, that more than 70% of the 100 top ranked US-companies are currently involved in reengineering projects, and even in Europe are more and more companies embarking on BPR.

### **2.3. The concept of reengineering**

Successful organizations are envisioned to be networked across functional boundaries and business processes rather than functional hierarchies. However, it is pointed out in literature, that simply using the latest technology on existing processes, respectively procedures, is no valid solution to the problem. The solution is found in taking a step further and rethink and question the business activities being a fundament for business processes. Effective redesign of business processes by removing unnecessary activities and replacing archaic, functional processes with cross-functional activities, in combination with using information technology as an enabler for this type of change will, according to the advocates of BPR lead to significant gains in speed, productivity, service, quality and innovation. Business reengineering normally includes a fundamental analysis of the organization and a redesign of:

- Organizational structure
- Job definitions
- Reward structures
- Business work flows
- Control processes and, in some cases
- Reevaluation of the organizational culture and philosophy.

BPR is generally conceived as consisting of four elements to be considered, as there are strategies, processes, technology and humans (see figure 2.1.), where strategies and processes are building the ground for the enabling utilization of technologies and the redesign of the human activity system. A brief description of these four

dimensions will be given below, while a more extensive discussion of the organizational and technological aspects can be found in chapter 3.

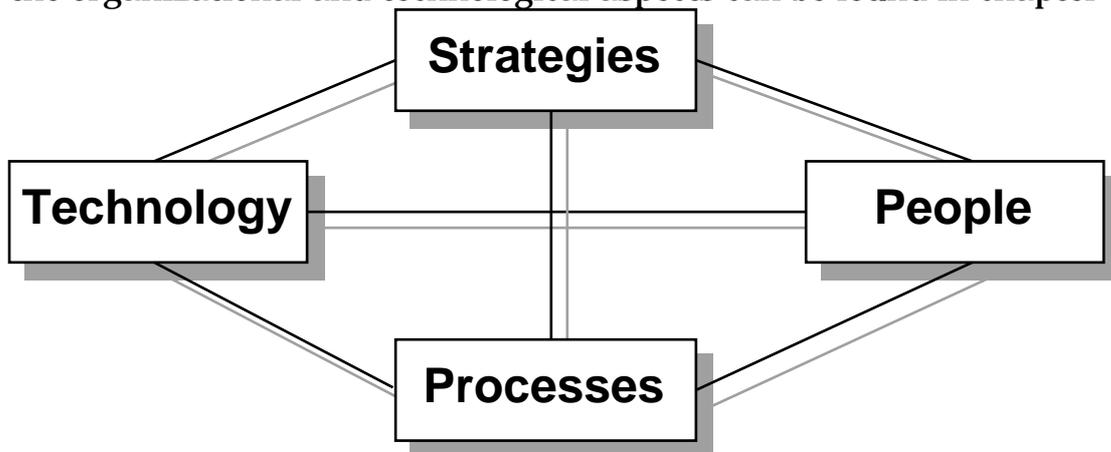


Figure 2.1.

### **Strategies**

The strategy dimension has to cover strategies within the other areas under concern, namely **organization strategy**, **technology strategy** and **human resources strategy**. The determination of all strategies has to be performed with respect to the dynamic marketplaces the organization is acting on and is not focussed on internalities, but the external presumptions for successful acting on markets. Beyond that, strategies have to be current and relevant to the company's vision, as well as to internal and external constraints, which implies, that a reconsideration and redefinition of strategies might be a presumption for further change. Finally, the strategies must be defined in a way that enables understanding and motivation of employees in order to align the work force with them.

### **Processes**

Processes can be defined on different levels within the organization. The issue is, to identify core processes which are satisfying customer needs and add value for them. It is important to point out, that processes are not determined by internal organizational requirements, but by customer requirements, even though organizational constraints have to be taken under consideration. The shift from functional departments to interfunctional processes includes a redesign of the entire organizational structure and the human activity system and implies process- instead of task optimizing.

## **Technology**

Information technology is considered as the major enabler for spanning processes over functional and organizational boundaries and supporting process driven organizations. However, the point is not to use IT as an improver for existing activities, as which it often has been conceived, but as enabler for the new organization. This includes using new technologies such as groupware, as well as new methods for using them and an acceptance of technological changes and the fact that information technology will be shaping the future.

## **People**

The human activity system within the organization is the most critical factor for reengineering. While top management support for reengineering efforts is rather simple to ensure, the real change agents, middle management are far harder to win due to the fact, that they have to identify change opportunities and perform them, while they are the group facing most threats, as BPR often is used for cutting hierarchies and reducing the work force. The other crucial factor is to align the work force with the strategies defined and to address the variable cultural and environmental contexts within the organization. Finally, flattening hierarchies implies decision making to be moved down in the organization and empowerment of the employees taking them. This requires training and education as well as motivation and trust from top management that people are able and willing to take responsibility, a fact that is rather contradictory to the "trust is good, control is better" way of thinking.

## **2.4. A methodology approach**

Even though a formalized standard methodology, based on a common framework that ensures success in reengineering projects hasn't yet been developed, several attempts have been made to develop such an approach. The existing methodologies, often developed by consulting companies share, however, several commonalities.

In order to improve the understanding of how BPR works I will in this thesis briefly present a methodology approach known as PRLC - Process Reengineering Life Cycle, as it has been described by Guha et.

al. [GUHA93]. The methodology consists of 6 stages which will be described and shortly discussed. A graphical description of the PRLC approach can be found below (see figure 2.2.).

It is important to point out, that presenting this particular methodology does not mean advocating it instead of others. The purpose is to give insight for unexperienced, or prospective members of the BPR-community on how BPR could be done. Naturally, the content of the methodology presented, as well as the underlying assumptions could be discussed critically, but this is not the intention here.<sup>2</sup> A critical discussion, in a more general way, can be found in chapter 4.

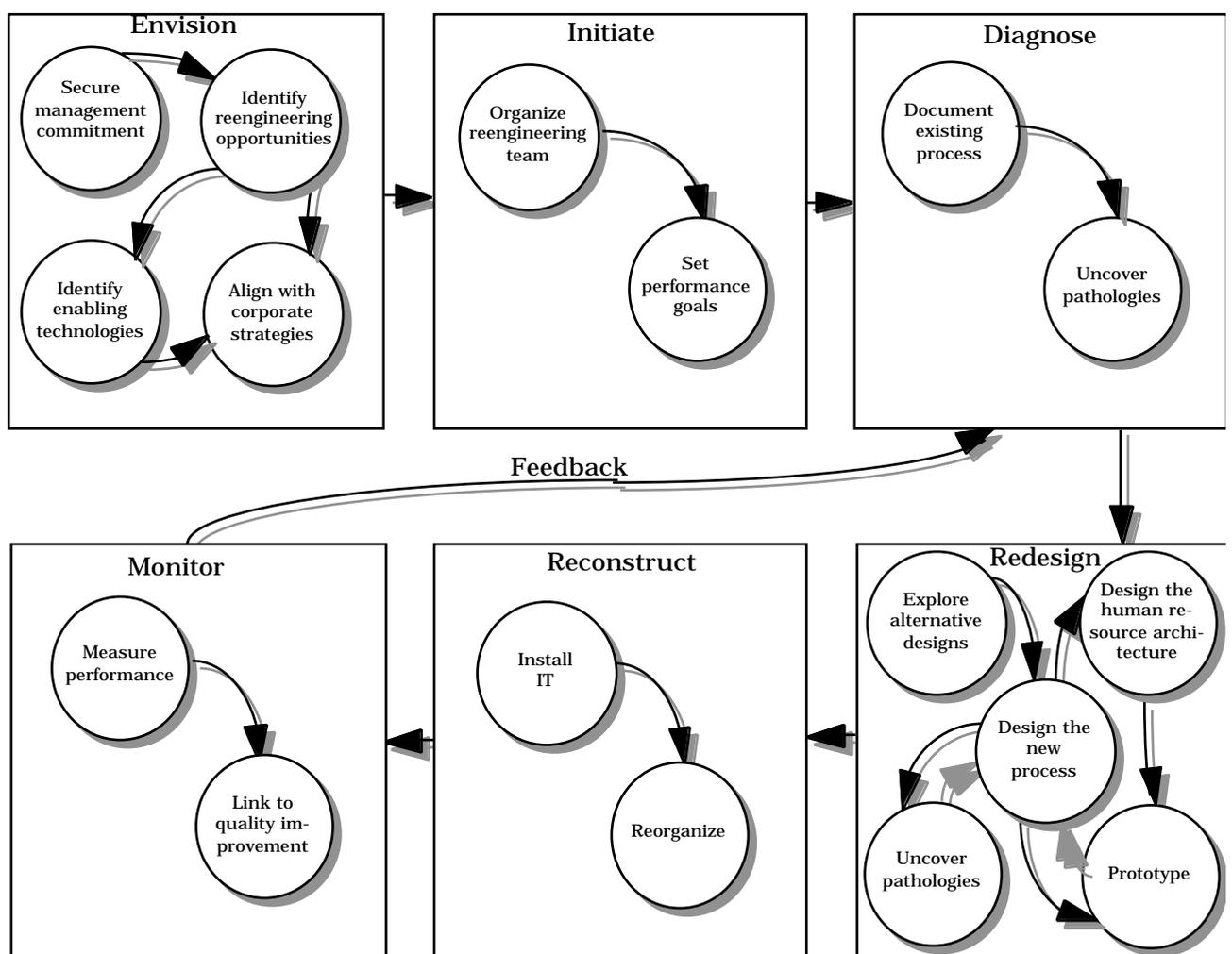


Figure 2.2.

### 2.4.1. Envisioning new processes

<sup>2</sup> The reader might wish a direct discussion with the authors. In that case, S. Guha, one of the authors and working with AT&T, can be contacted via internet at: [Subo.Guha@ColumbiaSC.NCR.COM](mailto:Subo.Guha@ColumbiaSC.NCR.COM)

Due to the radicality and the overall character of BPR, such a venture requires absolute support from the organization's top management. The organization's leaders start with an examination of how they would run their business without any constraints whatsoever. This process does not address the question of how current work can be improved, but how it should be done to achieve maximum performance in all measures. This stage even involves the aspect of aligning the reengineering effort with the corporate strategies and organizational goals. Nevertheless, if these strategies show out to be obsolete or inappropriate, a reexamination and redefinition might be necessary in order to adopt new externalities to the organization.

Within this first step, the necessary senior management support is secured, the vital processes are identified and enabling information technology is examined.

### **Secure senior management support**

It is substantial, that top management is willing to support reengineering projects. This involves the chief executive officer (CEO), as well as the heads of departments in the reengineering effort which is a necessary presumption for anchoring BPR throughout the entire organization.

A critical success factor in this concern is convincing management of the necessity of disregarding existing constraints and abandoning existing procedures and methods. Achieving this requires to make management understanding BPR within their frame of reference.

### **Identify reengineering opportunities**

Business consist of a large number of processes and the crucial matter is to identify those of them being adequate for reengineering efforts. This task requires firstly a commonly accepted definition of what a business process means, secondly genuine knowledge about the changing needs of customers and processes' potential for customer value adding.

### **Identify enabling technology**

The rapid pace of information technology development has removed many constraints in information handling. However, it is important to remember, that using IT is no self-purpose, but a way of supporting the activities within the business processes to be performed. Keeping this in mind, companies can use IT for achieving gains in speed, productivity a.o., while they, at the same time, are able to ignore geography.

### **Aligning with corporate strategy**

This step includes the examination of internal and external strategies related to the reengineering opportunities and enabling technologies being identified. The reengineering direction is determined according to the companies strategic market intentions and reengineering potentials without strategic significance are removed.

### **2.4.2. Initiating change**

In this stage, the reengineering project is prepared for performance. The reengineering team is assembled from a multiplicity of units within the organization and external change agents are, if necessary, allocated to the project. At the same time, the reengineering route is staked out and performance goals are defined and set.

#### **The reengineering team**

Due to the multifunctional character of processes, the reengineering team has to be assembled from a various number of departments. An overall company project may involve people from all departments, while minor projects may consist of members from the affected departments only. A result responsible team leader is assigned by top management and this team leader is then, in turn, assigning roles to the other members of the team.

#### **Performance goals**

The desired performance for the new processes is determined in this step. According to CSC Index Inc., there are three areas where potential benefits can be realized, as there are *time*, *cost* and *number of defects*. However, determining appropriate measures for performance improvement is a topic under discussion, so Nolan,

Norton & CO, another consultancy, proposes four dimensions of performance, namely: *Financial success, customer satisfaction, internal processes, organizational learning*.

### **2.4.3. Process diagnosis**

On the basis of the performance goals to be accomplished the reengineering is able to perform an in-depth analysis of the processes to be reengineered. Existing processes are described and hidden pathologies are uncovered. This stage is critical for the further success of the reengineering efforts due to its importance to process redesign.

#### **Describing existing processes**

A presumption for business process redesign is to gain genuine understanding how existing processes work, their span, linkages and bottlenecks. The following factors are important to take under consideration in process documentation:

- Description of the entire process.
- Identification of process elements and resources.
- Current process performance.
- Analytic decomposition of processes.

#### **Uncovering pathologies**

The pathologies of processes may have different nature, as there may be inefficient work-flows and sequences of activities, high costs, insignificant value adding for customers, a.o. These inadequancies have to be detected and documented. For this, quantitative as well as qualitative methods should be applied, depending on the nature of pathologies.

### **2.4.4. Process redesign**

Several dimensions are available as measures for redesigning business processes, as there are time, cost, productivity, quality and capital commitment. Using a single dimensional approach would lead to sub-optimization of processes, so a consideration of multiple dimensions is

to be used. However, some of the performance measures are concurrent, a fact that requires the definition of preferences.

### **Alternative process designs**

Obviously, several design alternatives exist for every process under concern. This step includes the exploration of alternative designs and their possible implementations in order to identify and determine the most appropriate process structure and enabling technologies.

### **New process design**

Designing new processes is a task of constantly questioning the necessity of performing a certain activity and how, if at all, it should be performed. Several factors are critical for the design of processes and have to be dealt with in order to succeed. A list of the most critical ones can be found below.

- Break patterns and disregard "common sense".
- Align processes with strategies and performance goals.
- Assign people to processes instead of single tasks.
- Dismiss hierarchical structures.
- Eliminate pathologies.
- Improve productivity by integrating fragmented work.
- Appraise enabling technology.

### **Designing the human resources architecture**

It can be assumed that there is a common agreement on the claim, that no organization is better than the individuals working in it. This makes the design of the human resources architecture being a most critical task within the reengineering effort, especially as major change in the human resource area comes along with reengineering. The following aspects are important for a successful restructuring of the human resources architecture:

- Redefinition of work descriptions, titles and positions.
- Application of team based management techniques.
- Encouraging organizational learning.
- Performance evaluation on team basis instead of individuals.
- Reward structures based on group performance.

- The double role of managers as team members and superiors.
- Continuous reengineering communication with employees.

### **Prototyping**

Prototyping provides an instant feedback to the reengineering on the progress and acceptance of the reengineering effort. Prototyping provides opportunities for simulating and evaluating reengineering potentials within the organizational, as well as the system development area. Continuous prototyping enables the reengineering team and management to make necessary adjustments before a final process design is chosen.

### **Selection of IT platform**

The IT platform has to be chosen based on its ability of supporting the new designed processes. Other aspects to be taken under consideration should be the adaptability to changing processes and new technologies. The information system architecture has to be chosen with respect to actual and future information requirements. Several alternatives are available and the choice of the IT platform should, in the spirit of reengineering, be performed without regarding constraints, whether they may come from the computer department, organizational actors, or any other interest group.

## **2.4.5. Reconstruction**

This stage includes implementing change and anchoring it in the organization and addresses the organization's ability of adopting change. Failure during change implementation may result in costly project failure and potential future inconfidence of employees.

### **Installing IT**

Using IT as an enabling technology for implementing change and supporting processes is one of the steps within the reconstruction stage. Depending on the radicality of change and the adaptability of the existing information technology, the existing systems may be changed, or replaced entirely. While the first alternative involves software engineering without affecting the hardware, the second way often

includes overhauling the current systems totally, including a new technical platform.

### **Reorganizing activities**

Adapting the organizational structure to make it fit the new defined processes is a crucial task. The changes in the human resources architecture have to be realized carefully in a new organizational structure without more than marginal disturbances of the motivation of the individuals being affected. While employee empowerment, subunit reorganization and job rotation often can be achieved without major disruptions, the reduction of staff, often coming along with reengineering projects, can cause major disruptions.

### **2.4.6. Process monitoring**

The identified and implemented process have to be monitored in an continuous process in order to scan their performance and contribution to quality improvement. This is made possible by an iterative process, in which the new process are used as input to stage 3 (diagnosis) of the methodology, and then being "looped". This includes, that reengineering projects are not handled in the conventional way of being initiated, performed and finished, but that reengineering is an ongoing process of permanent improvement.

### **Performance measurement**

For determining the reengineering efforts' success, or failure, the new processes' performance must be measured and compared to the processes being replaced. This performance measuring is performed in terms of the following aspects:

- Process performance: Cycle times, customer value adding, quality.
- IT performance: Information rates, system use, a.o.
- Productivity: employees, production, service operations.

### **Links to quality improvement**

Reengineering is closely related to quality improvement and should be linked with quality programs. However, there is a major difference in

focus between reengineering and approaches like TQM (Total Quality Management): While reengineering is concerned with abrupt changes and improvement, TQM is concerned with continuous improvement. Nevertheless, quality improvement is a major concern for reengineering as well.

### **3. Linking BPR to theory**

Business process reengineering has arisen during the early 1990s as an approach mainly developed by practitioners. Due to the pragmatic standpoint that often can be found within that group, theory development has been rather thin. There are more or less well defined methodologies, often developed by consultancies and interested managers, as the approach being presented in chapter 2, while many theorists have not embarked on BPR due to various reasons. In this chapter I will try to link BPR to the theoretical areas I have identified as being the most relevant ones. It can be assumed, that many members of the BPR community would disagree with my point of view, however, I believe that a multiplicity of opinions will gain the development of a stable theoretical bedrock for BPR.

#### **3.1. Customer value**

Adding value for customers is, by all BPR methodologies, considered as being most of the most important contingencies. This raises firstly the question what customer value means, and secondly how added value for customers can be achieved.

##### **3.1.1. The value chain concept**

The concept of value adding was originally developed by Michael Porter and described in his book *Competitive Advantage* in 1984 [PORTER84]. He states that

*every firm is a collection of activities that are performed to design, produce, market, deliver, and support its product. All these activities can be represented using a value chain. Value chains can only be understood in the context of the business unit.*

In the classical value chain (see figure 3.1.), an organizations' activities form a linear flow from the supplier(s), through the business, to the customer(s). The value chain includes firstly the "primary

activities", i.e. the activities the company has to perform in order to justify its right to exist. These activities are adding direct customer value to the product or service and the effective link of these activities has a major impact on the overall performance of the organization.

The "secondary activities" are supporting the former, in order to ensure organizational and managerial control, coordination among primary activities, as well as for developing and maintaining a corporate culture within the organization, and a corporate image towards the environment. Their value-adding effect is indirect and only realisable through the results of primary activities.

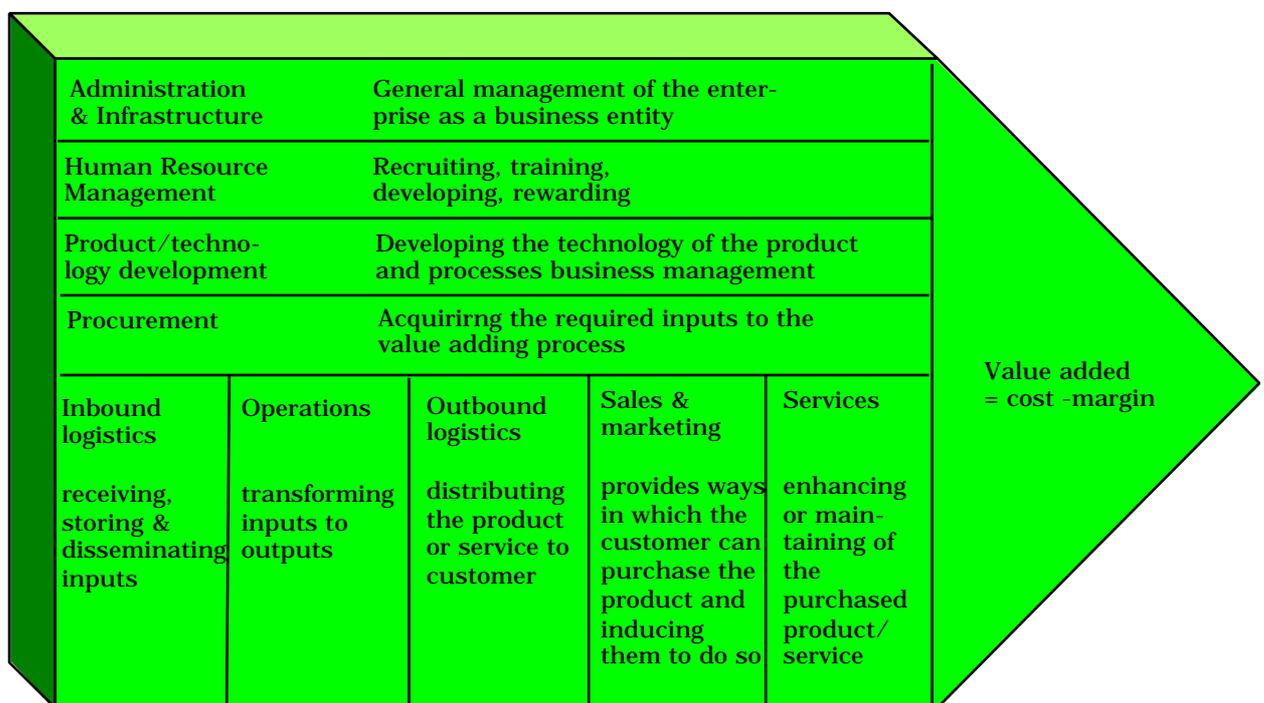


Figure 3.1.

The generic value chain model is a type of business activity analysis, a way of dealing with complex organizational structures, intended to decompose the enterprise into manageable parts for analysis and change processes. Some special features, however, makes the value chain analysis different from other approaches:

- 1) Separation of primary and secondary activities.
- 2) Focus on customer value adding.
- 3) Links the business-unit approach to strategic analysis and planning.
- 4) Is not concerned with organizational structures.

### 3.1.2. The industry value system

Beyond that, the value chain approach adds an environmental dimension to business unit analysis, i.e. that a firm's value chain does not exist in isolation, but is part of an industry value system (see figure 3.2.). This set of value chains is linking all companies involved in the process of product/service delivery, from the source of raw material to the final customer (for industry systems).

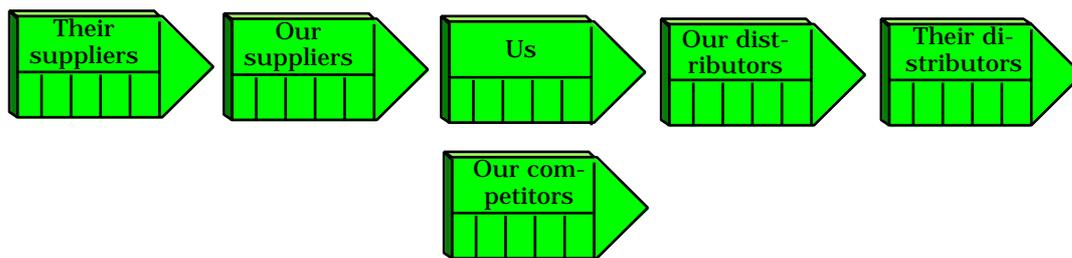


Figure 3.2.

The profitability of the entire system is depending on the customer requirements and the system's ability to fulfill them. This means the customer's will to pay a certain amount of money for the product is the determining factor for profitability, less the cost incurred by the component firms in getting the product to the customer. This conclusion implies, that cost reduction alone is not a satisfactory instrument for sustaining market positions.

Another important factor is the competition for profit within the value system. As Porter points out, the firm is not only meeting competitors in its competitive arena, even the companies being part of the own chain are bargaining for a larger share of the achievable profit in the value system. Normally, a balance between the single company's striving for profit maximizing and the total system benefit does exist in value chains

However, the equilibrium can be destroyed when a firms fail to achieve profit. This will result in either a rationalization of direct competitors, or a vertical integration within the chain.

### 3.1.3. BPR and value chains

It has been mentioned above, that the value chain analysis is independent from the analysis of organizational structures. However,

it provides a framework for considering business activities as the determining factor for organizational change, e.g. placing the focus of business activities and organizational behavior on customer requirements, which are even the major process focus in BPR.

The identification of primary, value adding activities, respectively processes as far as BPR is concerned, and their links and resource requirements is the major task for organizational change. However, the primary chain essentially describes how the business operates, not how it is controlled and developed. Control and development involves both primary and secondary activities, but the support activities' change process is determined by the required changes in the primary activity system.

In this concern it is important to highlight, that a product's or service's total customer value consists of two elements, the direct product/service value and the additional value (see figure 3.3.).

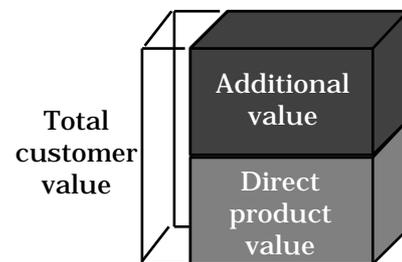


Fig. 3.3.

While the direct value is determined by the value of the product/service itself,

additional value refers to value that can be added by factors like superior service, fast delivery, aso. This can be exemplified by the following example.

When Toyota tried to enter the market for luxury cars, it was obvious, that the chance of cuncurring with brands like BMW, Mercedes a.o. was minimal in terms of image, even though the Toyota Lexus was fully capable to give this brands a match in performance and quality. However, the Toyota management decided to add value by superior quality in service, which meant that the car is fetched and delivered for service, and a free replacement car is provided during service team. Depending on the nature of the product/service a company is providing, the additional value can be of highly considerable importance. On a market with highly standardized products where direct price competition is impossible, the additional value for customers might very well make the difference between products that makes the customer buying it from one company instead of another.

### 3.2. Organizational aspects of BPR

Applying BPR on an organization includes the rearrangement of organizational structures, processes and tasks, as well as the relocation of individuals and changes of work descriptions, positions and titles. The problemacy of organizational analysis, design and change has been a concern for almost any theorist within the area of organization in its narrow, as well as wider sense, and this section will give an introduction to classical organization theory and its links to BPR.

### **3.2.1. History and problem of organization design**

The basic problem of organizational design has, by March and Simon [MARCH58], been identified as being the following:

*Given a general purpose for an organization, we can identify the tasks necessary to achieve this purpose. These tasks will normally include productive activities, service activities, coordinative activities, supervisory activities, etc. The problem is to group these tasks into individual jobs, to group these jobs into administrative units, to group these units into larger units, and finally to establish the top-level departments - and to make these groupings in such a way as to minimize the total cost of carrying out these activities.*

Although the first theoretical foundations on the departmentalization of organizations and the allocation of tasks to humans can be found in Aristotle's writing "Politics" [ARISTOTLE], the basic theoretical foundations about the problemacy of organizational structure and behavior in modern time have been explicitly defined in the beginning of the 20th century.

In 1911 Frederick Taylor published his work "*The Principles of Scientific Management*" [TAYLOR11], in which he investigated the effective use of human beings in industrial organizations. He was most concerned with the kinds of tasks to be performed on the production floor and in clerical departments. These tasks are characterized by being largely repetitive, and by not requiring complex problem solving activities by the individuals performing them. However, many modern

organizations have taken measures towards job-enrichment and job-enlargement, which makes many of Taylor's assumptions being anachronical. Beyond that, Taylor's theories are hardly applicable on the types of organizations being under concern in this writing.

The essay of L. Gulick from 1937 [GULICK37], together with the writings of Henri Fayol [FAYOL30] and Oliver Sheldon [SHELDON26] is generally accepted as being the fundament for modern administrative science.

### **3.2.2. Process- vs purpose-departmentalization**

In his work, Gulick emphasized the different ways of dividing work. Even though there are numerous ways (some concepts will be introduced in the next section), they conventionally fall into one of two categories, which Gulick refers to as

- process departmentalized, or
- purpose departmentalized.

Purpose departmentalization encompasses work arrangements built around products, geographic locations, or specific customers. Departments are built around specific, self-contained purposes or outputs, and this type of departmentalization emphasizes an external, "market" orientation [DESSLER76, MARCH58]. In organizations, departmentalized by purpose, all (or almost all) necessary resources for performing a purpose are available through a single manager. On the other hand, departmentalization by process is more "production" oriented, isolating functions such as purchasing, manufacturing and sales. This functional specialization frequently leads to higher functional efficiency [DESSLER76, MARCH58], but does not address the overall performance within the entire value system.

Citing L. Gulick himself [GULICK37]:

*Process departmentalization generally takes greater advantage of the potentialities for economy of specialization than does purpose departmentalization: purpose departmentalization leads to greater self-containment and lower coordination costs than process department-alization...*

However, March and Simon [MARCH58] pointed out, that choosing between purpose and process departmentalization is largely a trade off. They state that

*the forms of departmentalization that are advantageous in terms of one of these outcomes (self-containment vs skill specialization) are often costly in terms of the other.*

It can be concluded, that the content of the term "process" as it is used in BPR differs significantly from its use by Gulick and Urwick. While G. and U. refer to functional decomposition when using the term "departmentalization by process", process orientation in the sense of BPR is more comparable to what G. and U. refer to as "purpose departmentalization". This can be underpinned by several statements, of which two will be cited here.

Said Thomas Wheeler, MITRE Corporation in McLean, USA [NET1]<sup>3</sup>:

*I am nearly certain that 'process' in 'departmentalization by process' does NOT refer to a process in the BPR sense, but rather to what I call FUNCTIONS to distinguish them from BPR processes.*

And Phil White, member of the Informatics Process Group, University of Manchester, states [NET1]:

*Yes, the meaning [of the term process] has changed totally. Process perspective is now contrasted with functional perspective, so "departmentalisation by purpose" is in fact far closer to what we now take as a "process view"!*

### **3.2.3. Formal organizational structures**

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<sup>3</sup>All citations marked with "[NETx]" are taken from discussion groups on BPR at internet. For any of these citations, the following caveat is valid: All opinions expressed are strictly personal and do not reflect the opinions of the organizations the cited people are working with.

Organizational structure is the arrangement of organizational sub-systems, or sub-units into a hierarchy of authority relations. This process includes the division of labour, the allocation of resources needed to perform tasks and the definition of areas of responsibility [HALL82]. Even Mintzberg's formal definition [MINTZBERG87] is building on the same presumptions, though he describes the organization structure as

*the summation of the ways in which a firm's labour is directed and coordinated into tasks.*

This definition of viewing on an organization in terms of division of labour and managerial supervisory to maintain that, is portrayed by a company's organization chart, where it is stated who is responsible for what and reports to whom. As it has been stated above, there are two main alternatives for dividing organizations, and both of them will be described and related to BPR. However, are more general introduction to the aspect of formal organization structures will be given first in order to provide a basis for the further discussion.

Organizations differ due to a lot of reasons, it is therefore necessary to point out, that there is no best universal organizational structure. The structure is, even though building on a specific theory, unique and has to fit the organizations requirements for flexibility, information handling, specialization, a.o., needed for a succesful acting in the enterprise arena. Even though organizational structures are unique, they follow a philosophy, that describes the organizations consideration of aspects like control, sub-ordination and management.

We can, according to the classical view which differs significantly from the organizational view of BPR, divide organizations into two elements, the formal organization, which means a combination of organisational "basic elements", like function or department, and the process organization, dealing with the structure and design of activities, or work processes. This differentiation can be seen as a scientific "trick", aimed to simplify the analysis, design and description of organizational behavior and in practice, such a differentiation is almost unachievable, due to the mutual implication between the charted institution and its activities [KOSIOL62].

Organizational structure and processes are aimed to integrate all activities within the enterprise towards the goals to be achieved. Beside we will, in practice, always find a parallel, informal organization, based on the result of individual human behavior, like sympathy or antipathy, common interests and social status.

The parallel existence of the formal and the informal organization can either improve the effectiveness of the organization, or be a hinder for cooperation within and among organizational sub-units. The knowledge of informal structures, the encouragement of positive impact and the avoidance of conflicts among social groups is therefore an important task.

The aim of organizational analysis and modelling is to divide the task structure of the enterprise into partial, manageable and comprehensible units, under the premises of mission and policies [KOSIOL69]. Task can, in this concern, be defined as a rule, or less strict as a guideline, for human activity [KOSIOL62].

The traditional organizational structure can be depicted as a **hierarchical, or pyramidal structure of positions**, where each position has authority or right to command sub-ordinated positions associated with it (see figure 3.4.). Authority is evidenced by control over resources, rewards and tasks and the decisions regarding them.

Each position has a span of control, which describes the number of immediate sub-ordinated units. An organization may have very narrow and very wide spans of control on different levels, depending on the tasks to be performed, the supervision required, the degree of formalization and the number of rules and guidelines provided for decision taking. There are three aspects -

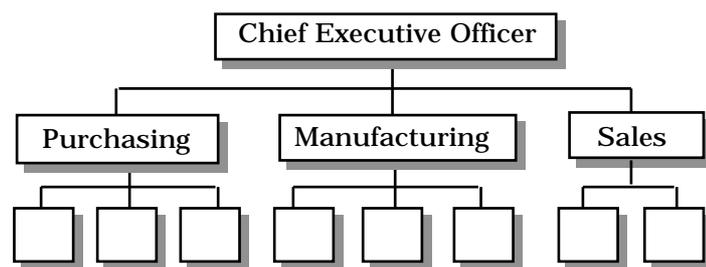


Fig. 3.4.

specialization,

formalization and centralization - that have to be considered as being critical to the choice and implementation of organizational structures. The chosen levels of these aspects will have major impact on the choice of structure, leadership style and management principles.

**Specialization** refers to the division of labour within the organization. The organization is divided into functional lines, like

accounting, manufacturing and sales, where specialization is desired and encouraged. The degree of specialization may be differing along the functional lines, depending on the products as well as on the management philosophy. Research may contain highly educated and trained professionals, working in a flat, almost non hierarchical organization and a high degree of independency, while manufacturing along assembly lines uses narrowly defined tasks, non specialist workers and intensive control.

**Formalization** describes the extent to which rules, procedures and guidelines exist, that are aimed to handle organizational activities. One indication of formalization is the degree to which decisions for handling various situations are programmed and decision-rules are pre-defined. The more formalized the organization, the less discretion individual organization members have in making decisions and initiating action.

**Centralization** refers to the level in the organization where decisions are taken. In a highly centralized organization, decisions are mainly taken at the top of the hierarchy, the more decision making authority is delegated to lower hierarchical levels, the greater the decentralization. Centralization refers to hierarchy as well as to formalization. A flat hierarchy with a wide span of control is often considered as being decentralized, while a narrow span of control and a tall hierarchy is associated with centralization. In a highly formalized organization, people on low level positions take decisions by rules that have been specified in advance by higher-level personnel, exceptions are referred to these higher levels for decision.

#### **3.2.4. Departmentalization by purpose**

As it has been pointed out above, organizational structures built around products, services or markets has been considered as being an alternative to functional departmentalization since the 1930s, at least as far the administrative area is concerned.

Structuring an organization around products would imply, that each product will have its own function for exampelwise purchasing or manufacturing. In this case, the focus is rather put on the organizational output than on the processes to be performed.

This type of organization structure is often called **divisionalized organization** (see figure 3.5.), especially when the divisions are relatively independent.

This structure is aimed to group all decisions concerning a group of highly interrelated outputs under a unified command.

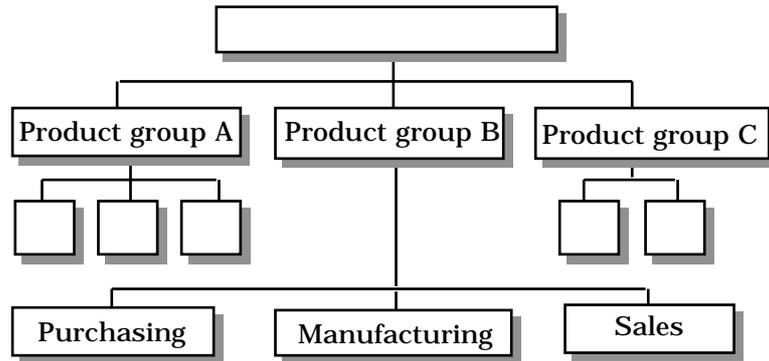


Fig. 3.5.

One example for this is

the Swedish company Mölnlycke, providing a wide range of cellulosa-based products on all relevant markets worldwide and divisionalized by the types of products manufactured from the cellulosa raw-material.

In **project organizations** (see figure 3.6.) resources are assigned to projects, each headed by a project director. A consulting company may be organized that way. This structure can be conceived as a dynamic form of the divisionalized

organization, where the reassignment of resources, due to the temporary form of the projects, is of major importance for the effective use of them.

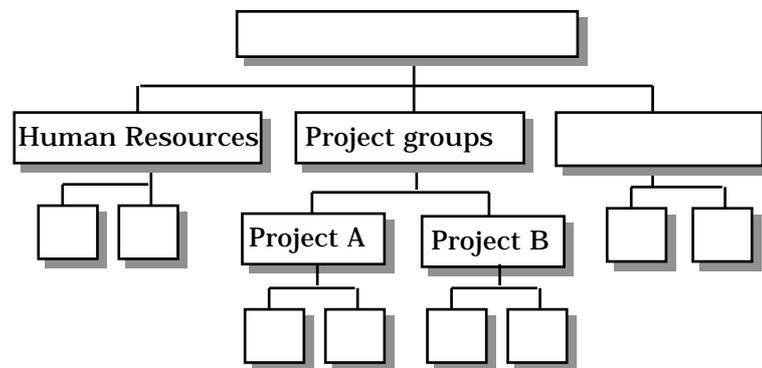


Fig. 3.6.

The project manager

has considerable authority for the duration of a project.

It may be efficient to combine several, highly interacting activities into a single function. The fact that different products may use the same function creates a need for coordination and conflict resolution, since the objectives of the organization are their products, but the organizational structure is originally of functional character. Organizational methods for reconciling the functional organization with product objectives are termed **lateral relations**. The implementation of lateral relations is not bounded to a specific organization structure, but can be represented formalized by the

implementation of a **matrix organization** (see figure 3.7.). Some sample methods for providing lateral relations are described below.

- Direct contact among managers. Managers establish direct contacts with other managers to resolve inner-organizational conflicts.
- Liaison roles. The responsibility for coordinating the lateral flow of a product, or service, is assigned to an individual.
- Conflict management. A formal group with representatives from each department is established to resolve conflicts.
- Team establishment. Teams are formed to resolve frequently occurring problems.
- Integrating personnel. They do not supervise operative work, but integrate the output of independent sub-units.

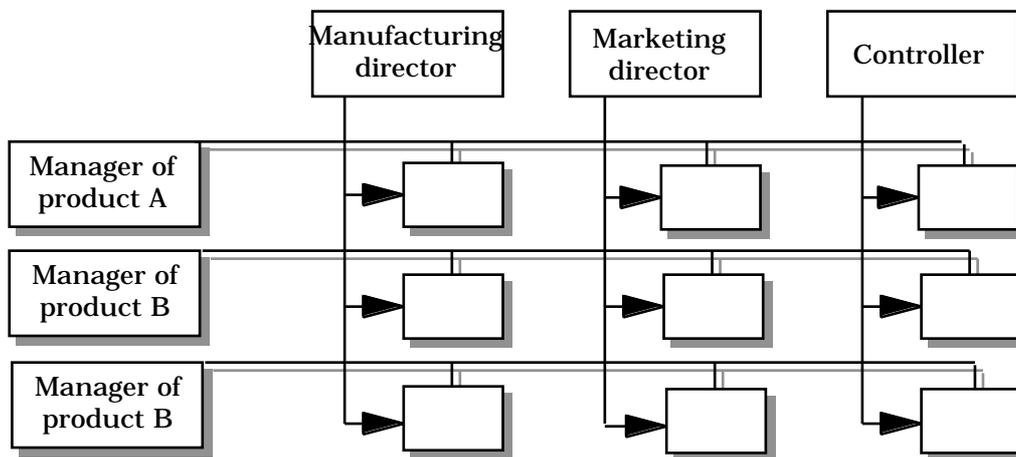


Figure 3.7.

The matrix organization is, as stated above, the formal implementation of lateral relations. For each product or service, there is a separate, integrating department or function, which has lateral relations with the relevant parts of the formal, functional organization. Each level of the organization affected has a vertical authority relation for the function and a lateral authority relation with the corresponding integrating instance.

The matrix organization is often used in large, diversified companies. In typical matrix organizations, business units are organized around product or service lines, and lately through the increasing popularity of process oriented approaches, around one or a set of processes. In this kind of structure functional specialists in each unit, or process, report to the unit manager, or process-"owner", but they even have

responsibility to the corporate functional head. The corporate function exists as a kind of knowledge-center and provides training and education and, if requested, even standards and supervision for the performance of the business unit within the functional areas being concerned.

### 3.2.4. The organizational view of BPR

Classical formalized, hierarchical structures are, within the BPR approach, considered as being one of the main reasons for the disability of organizations to react flexible on changing environmental implications and to satisfy customer requirements, as well as for low productivity, long cycle times and high costs. Therefore new ways of dividing organizations into sub-units and dividing labour within those are conceived as being a fundamental need for companies aiming to improve productivity and putting customers into the focus of the organizational activities.

The organization around business processes, those having the characteristics mentioned above, is seen as the solution of aligning organizational structures with the activities being performed within them. This view makes the formal and the process organization being congruent with each other and reduces goal conflicts and misfits between structure and activities.

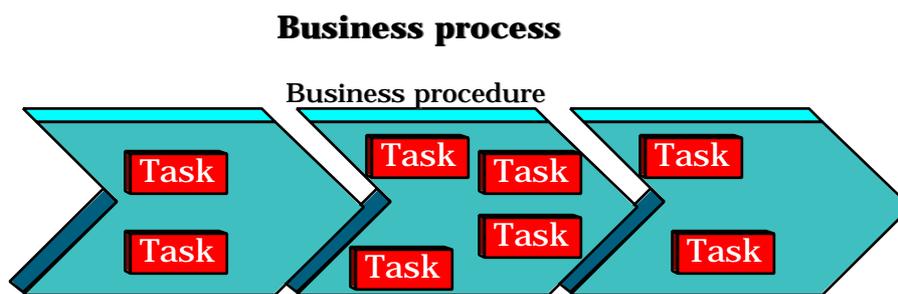


Figure 3.8.

Beyond that, customers are taken into strong consideration when the organizational structure is determined which moves the focus of change management from internalities to externalities. A process looks typically as described in figure 3.8. and can, based on the former theories presented, be characterized as following:

- **A business process is a set of interrelated tasks that must be performed to accomplish a business objective.**
- **A business process is organized around the purpose of adding value for customers.**
- **A business process can cross functional and organizational boundaries.**

### **3.2.5. The division of labour**

The problem of organizational design is not only concerned with the departmentalization of the organization, but even with the division of labour within the organizational sub-units. In the same way as organizations are divided into departments, work can be decomposed into small units, tasks, each of them containing a part of the overall task. This concept encourages specialization and high skills within a bounded functional area, which increases the output significantly. A case study in a pin-factory was performed and described by Adam Smith [SMITH1776] in the 17th century, showing that productivity was increased by 240 times (24.000 %), when the task of producing pins was decomposed into ten sub-tasks. Another description of the concept of labour division can be found in the work of Babbage from 1832 [BABBAGE1832] (see figure 3.8.). Despite these impressive figures, hard functional specialization has shown to be inadequate for solving complex tasks requiring knowledge about several functional areas at the same time. Therefore several attempts have even been made to integrate different functional skills into a single, task solving group, or a team, as it is called as well, in order to reduce communication delays and improve decision taking.

#### **Figure 3.8.**

Direct contacts between departments, as well as lateral relations make sense in organizations with well-defined functional tasks. However, with an increasing number of participants from numerous departments, these concepts are rather insufficient for reaching joint decisions without major delays, caused by extensive communication among the parts involved. Establishing task forces or teams may be the answer to occurring problems in interdepartmental task solving. Both concepts are integrating members with different functional skills

from the departments concerned into a working group, built around a specific task to perform or problem to solve.

Task forces are temporary groups, they are established when a problem occurs and suspended as soon it is solved.

Task forces are removing decision taking processes

from higher organizational levels to the level actually being concerned, following the subsidiarian principle. Often, task forces are established and composed in an unformal way, trying to solve occurring problems in an ad-hoc and reactive manner, however, even pre-composed task forces, taking action in specific problem situation are found.

With increasing dynamics within the organization or its environment, tasks become more unpredictable. The proper response is to use problem solving groups on a more permanent basis than task forces. Such teams can either meet regularly, or they are working at a single location. Teams can be formed at various organizational levels. It would actually be possible to design an entire organization based on teams on different levels. However, the assignment of tasks to teams involves the same problems as a conventional departmentalization.

### 3.2.6. BPR and labour division

The labour division concept being proposed within the frame of BPR is rather similar to the concept of task forces, if task forces are considered as being teams built around a task (or process) to perform, instead of being a group assembled for reactive "quick-fixing" of suddenly occurring problems.

While conventional labour division is based on subordination and delegation of tasks, often without the necessary delegation of decision-authority and under a strict control, BPR advocates self managing teams, containing of empowered members as a solution to the problemacy of decision and communication delay, as well as a way for improving organizational capacities and customer service.

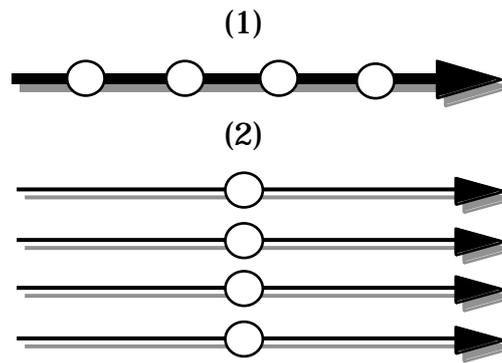


Fig. 3.8.

The communication within the team is performed in three different, but complementary ways, as there are direct contacts among team member, team meetings and informal meetings. An important point is that due to the use of modern technology, the team members do not have to be physically located at the same place. Communication can take place by video conferences, electronic mail and other computerized tools.

The problemacy of organizational complexity and the difficulties in communication, task fragmentation and organizational design being related to it will be discussed in a more theoretical way later on in that chapter.

### 3.2.7. Organizational culture and power

Many of the classical descriptions of organizations are directed towards the formal organization structures and the description of work performed within these structures. They do not deal with some of the most important and significant aspects of organizational behavior. These behavioral aspects are very often highly critical to the success of enterprises and by looking at the information chart only, factors that are vital to an understanding of the organization may be missed.

The most important of these factors, even part of Leavitt's enlarged organizational model (see fig. 3.10.) [LEAVITT65], is the **organizational culture**. Organizations as a whole have a culture, and organizational sub-units have their culture. This culture may be rather well defined, as a part of the institutions mission, but it may even be relatively obscure. The culture often reflect dominant ideas of the institutions founders or leaders. Some examples of perception of organizational culture are:

- Technology leader,
- price leader,
- quality leader.



Fig. 3.9.

The cultures of different organizations differ with respect to the value attached to factors as accuracy, technology or customer relations. For example, a financial institution like a bank expects a high level of accuracy in data, while a merchandising company may focus on customer relation. The cash and securities inventory figure of the financial institution is

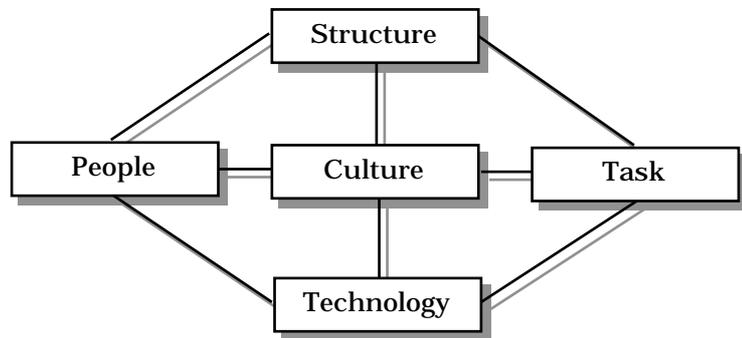


Fig.3.10

very precise, while the accounts receivable and the good-for-sale inventory figures accept a lower level of data accuracy.

Differences in culture can also be observed within organizations. Accountants have a culture which emphasises accuracy, reinforced by training and tales of "finding the one cent error", while salespersons have a culture that focuses on the sale, without the concern for "a few bucks here or there".

Such cultural differences within an organization may create cultural clashes as accountants with their respect to accuracy conflict with the leisure attitude of sales people. It is therefore important to determine and apply strategies to decrease the negative impact of cultural conflicts on the organizational performance. The acceptance of different cultures within and among institutions is reflected by the **workability concept** [SIMON94]. Workability reflects the needs for a harmonious cooperation between individuals. Workability is based on firstly mutual agreement on the objectives to be achieved by cooperation as well as on the role of the information systems and information systems architecture within this context. Secondly, workability implies reciprocity. In other words mutual contributions to the expectations of the involved participants. Workability is the result a political process including negotiations and compromises in order to establish a common image of reality.

An aspect, closely related to organizational culture is **organizational power**, which refers to the ability to accomplish objectives by utilization of human and other resources. This power is not distributed

uniformly throughout the organization. Some units are more powerful than others, depending on available resources, human motivation and existing target conflicts or a lack of organizational culture. According to Hickson et. al. [HICKSON74], we can find three contributors to the power of organizational sub-units:

- Workflow pervasiveness. The number of tasks in the organization which are depending on the units output.
- Immediacy. The speed at which the loss of the unit would affect the performance of other sub-units.
- Substitutability. The ability of an other unit to perform the activity or to find alternative suppliers.

### **3.2.8. BPR and organizational culture and power**

Addressing people within their cultural context is a major task for successful reengineering efforts. Neglecting the impact of organizational culture on the task performance ability and adaptability of environmental changes will result in failed projects and thereby disrupt the ability of changing to the better.

However, creating an organizational culture that enables responsibility taking and directs the efforts of all organizational members towards the goals to achieve can not be considered as being simple. The integrating factor is the common understanding of strategies and the alignment of humans with them, which implies strategies being defined in an understandable and motivating way, while they are linked to the dynamic organizational environment. At the same time, people must be able to integrate and understand their own work into the strategic context.

Aligning humans to strategies, without putting them under extensive supervision and control requires them to be able to take the necessary decisions within the scope of their own work. This necessity presumes, that employees have the education and training for doing so, but even the formal decision authority. This empowerment concept comes along with the redesign of the human activity system from being hierarchical, functional and task oriented to become process based and more flexible. It can be assumed, that this change process can require

major disruptions of the existing power bases and informal organization structures.

### **3.2.9. Organizational learning**

One of the most important aspects of organizational behavior is the need for change in response to environmental changes. This implies the displacement of goals, organizational learning and the adaptation of new organizational structures and processes.

It is common to talk about a company's goals as if the organization existed apart from its members. As discussed above, organizations can and must be considered as being a collection of individuals, each with personal goals that may be contradictory to the goals established as the company's. Institutional and personal goals change in response to environmental changes, changes in inner-organizational coalitions and circumstances related to specific institutional members. One of the problems related to the management of change is **goal displacement**, where primary goals are replaced by goals aimed to satisfy the convenience of a secondary group. Exemplarily we can find government agencies designed to regulate business, which are protecting firms from business competition instead. Goal displacement will reduce the institutions ability to react on environmental changes and may decline or decrease the institutions effectiveness.

The process of detecting and correcting errors, adapting new strategies as a result of environmental changes and storing experience in organizations is called **organizational learning**. Organizational learning can be encouraged by management practices and organizational culture, the organizational environment or by training and education within the organization. Argyris [ARGYRIS82-1, ARGYRIS82-2] divides learning processes into "single loop learning" and "double loop learning". Learning that takes place within the context of implicitly or explicitly adopted theories is termed **single loop learning**, learning that focuses on underlying assumptions and theories being used is referred to as **double loop learning**.

According to Curley [CURLEY83] the learning of individuals within organizations is often restricted to the so called "**type A**"-learning, which means that the institutional members are educated only in increasing their performance rate, whereas the need of knowledge

about the relation between organizational sub-units, the multi level consistency of goals and other aspects concerning inner-organizational relationships, the so called "type B"-learning, is frequently neglected.

### **3.2.10. BPR and organizational learning**

Applying the concept of organizational learning is a major presumption for successful change management in general, and for BPR projects in particular, as the entire concept fails without it. Double loop learning is a major factor for empowering employees and making them able to take responsibility for their action. Making them aware of their own importance for the performance of the whole and how their own work fits into the puzzle of work in the entire organization encourages learning and the adaption of new skills required for fulfilling the expectations focussed on them. This addresses even the issue of recruiting new members to the organization. While existing employees must be trained and educated for fitting the requirements put by the new task structure, new individuals should be recruited with respect to the task profile that has been defined in order to avoid costly training on the job and failures during the introduction time.

### **3.2.11. Organizational change**

There is general consensus on the need of **organizational change** as well on the fact, that there are lot of difficulties related to it. Change is not a simple process of implementing a new organizational structure and explaining its advantages compared to the old one, change can threaten the interests of groups within the organization, it can be desirable to one group and perceived as bad by another. Beyond that, an uncertainty about "what is going to happen" is often found, even if the result to strive for seems to look good [LEWIN58]. Lewin has developed a three stage model to enable organizational change, based on the assumption that organizations are stable systems, that have to be disturbed before change can take place. It implies as well, that there is an explicit need and request for changes, expressed by organizational members. A contract, which means the establishment of a common image of the changes to be performed, has to be achieved and it is important to implement the changes by procedures, training

and evaluation. Margulies and Raia [MARGULIES78] have described the nature and process of planned change as following:

*(1) Planned change involves a deliberate, purposeful, and explicit decision to engage in a program of problem solving and improvement. The critical words in this dimension are "deliberate" and "purposeful". Planned change is change which is intended.*

*(2) Planned change reflects a process of change which can apply to a variety of human client systems. The notion of planned change can be used to implement change whether the client is an individual, a group, an organization, or a community.*

*(3) Planned change almost always involves external professional guidance. ... Planned change generally involves the intervention of someone who has professional skills in the technologies used to implement the change...*

*(4) Planned change generally involves a strategy of collaboration and power sharing between the change agent(s) and the client system.*

*(5) Planned change seeks utilization of valid knowledge or data to be used in the implementation of change. Planned change, then, is an extension of the scientific method...*

The entire BPR approach is an attempt to cope with organizational change required by dynamics in an organizations environment. The above stated characteristics of planned change are valid for BPR as for any other approach to organizational change. Stating them into the context of this work is an attempt to highlite the presumptions for planned change within organizations and to remind change agents of the fact, that change, of any kind, is no self-purpose, but a delicate process which must be performed in respect to the specific circumstances an organization brings with it.

### **3.2.12. General reflections on organizational complexity**

The following section is intended to briefly discuss the crucial issue of organizational complexity and the problems concerning fragmentation, communication and organizational design being related to it. Due to

the fact , that this problemacy and its discussion here has a general character, it will not be linked directly to BPR. Nevertheless, the aspects discussed below are of high importance for any change attempt involving organizations and should gain high consideration.

### **3.2.12.1. Organizational complexity**

Managing organizations is a matter of dealing with complex formal and informal structures. All organizations in the classical sense where humans are involved have a clearly hierarchical structure, due to the plans that are used to govern organizations and that constitutes an elaborate hierarchy in the organization.

The question of organizational structure is always closely related to the crucial issue of hierarchy specification. The structure of an organization, no matter which formal structure is used, is the result of the factoring process of large, complex structures into smaller, less complex sub-units. This is done by relating the global goals, or mission, of the organization to the means to accomplish them. Each organizational sub-unit contributes to the achievement of a higher level goal and thereby ultimately to the mission. The lowest-level sub-units will be termed elementary tasks, which means that their structure is not described in terms of further sub-activities.

If it is now assumed, that the elementary tasks are fully describing the global task, the consideration of an organization as being more than a collection of sub-units is depending on the way of structuring the tasks to be performed. Different structures will lead to different results, depending on the change agent's ability to find an optimized task structure, that can be used as a platform for the coordination and cooperation among the different elements of the organization. As J. Galbraith [GALBRAITH77] stated, there is no one best way to organize and not all the ways are equally effective.

### **3.2.12.2. Organizational fragmentation**

The organizational structure, graphically described by the organization chart, describes the way in which sets of tasks are grouped into units,

which are in turn combined to higher-level units aso., until we reach a level where a further integration is undesirable or useless.

Hierarchical fragmentation of organizations implies interaction among the identified organizational sub-units, but it even implies boundaries among these units and thereby enables simplification.. This simplification will lead to communication barriers among interacting activities in different units and requires a sub-optimization. In traditional hierarchical organizations all communication is passing through a number of nodes in the tree, which increases the communication flow through higher-level nodes enormously. In order to avoid this problem, Henri Fayol [FAYOL30] proposed the establishment of direct communication channels among direct interacting tasks. This principle, known as **Fayol's bridge** (see figure 3.11.), will reduce the amount of information, flowing through nodes with a wide span of control, to a manageable level. However, Fayol implied, that direct communication only was allowed on agreement of the supervisory functions of both parts involved.

Fragmentation can be defined as a separation of a task in two or more sub-tasks. Each fragment may, in turn, be separated in a number of sub-tasks until an elementary level is reached. The decision, when the elementary level is reached is a matter of the desired level of complexity to remain. The total fragmentation can be measured by the fragmentation range, that means the number of nodes in the tree. Each task has a span and a depth, that describes the remaining levels to the elementary task level.

The ubiquity of multi-level hierarchies testifies to their usefulness. The relative isolation of the organizational sub-units reduces the number of relations to be considered when coping with tasks.

However, the price to pay is the required sub-optimization of the sub-units, in order to obtain an appropriate balance between the desired simplicity and the need to communicate with other sub-units. The balance point is depending on the nature of the tasks to be performed. A strong interaction requires a

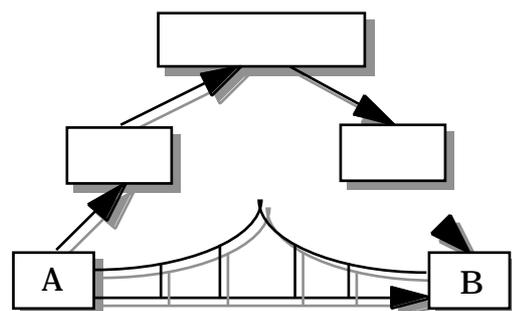


Fig. 3.11.

narrow range of fragmentation in order to keep tasks manageable. A weak interaction, on the other hand, increases the rangeability.

### **3.2.12.3. Communication among sub-units**

In order to coordinate the activities of all organizational sub-units towards the mission, communication is required. Considering the interactions, the behavior and success of any sub-systems is strongly depending on the activities of others. As it has been pointed out, direct communication among all sub-systems is impossible in a system of even moderate size. Therefore hierarchical communication channels may be established to reduce the total numbers of links to be maintained by the sub-units. The price to pay is that all communication, except the node-to node one, has to pass a several number of nodes between the sender and the receiver, where each node tends to introduce delays and distortion in the messages passing through it.

To avoid serious disturbances in the information flow, direct links can be established among closely related activities. These direct links offer both the advantages and disadvantages of direct communication. They avoid delays and distortion, but may result in an unwieldy proliferation of information channels. Fortunately, a task normally only interacts with a limited number of other activities and so the need for direct communication channels is rather limited.

### **3.2.12.4. Criteria for Choosing a Structure**

As shown above, the number of possible task combinations is, in practice, infinite. This fact requires heuristics to restrict firstly the number of combinations by eliminating "nonsense" combinations, secondly the construction of "task blocks", containing a number of closely related actions and considering them as a single task.

The following criteria may be used for choosing an appropriate structure:

- Information processing requirements,
- Interaction among tasks,
- Complementarity among tasks,
- Multi-level goal contingency.

Technical and architectural limitations on information processing impose several restrictions to the choice of organizational structure. One intention should be to keep the number of information channels as low as possible. This would imply a structure with a span on  $n$  ( $n \rightarrow$  number of tasks) and a depth of 1. But, it is not difficult to understand that such a structure is impossible with  $n$  exceeding 10, due to an impossible information burden on the higher-level node. Therefore a structure must be chosen that compromises with the number of communication channels on one hand and the need for a manageable range of tasks. Because of these complexities and the unique presumptions of any organization, there is no way of generalizing or pre-setting the span or depth of the organization structure.

Normally, the activities combined under a node are closely interacting. This simplifies the task of dealing with interaction and facilitates communication. Most sub-units are, linked by hierarchic communication channels, even though a number of direct links exist between closely related activities in distinct sub-units. These direct communication channels are often used for non-routine matters and informal information exchange. This way of clustering tasks together provides an important opportunity to reduce the information flow through nodes in the hierarchic structure and reduces the risk for delays and distortion. It is therefore advantageous to combine strongly interacting tasks.

We will often find a situation where two or more tasks can be performed jointly more efficiently than separately. These complementarities may arise by sharing resources among tasks, the economy of scale or other synergy aspects. The degree of complementarity of a structure is an important criterion in evaluating its suitability. On the other hand, complementarity increases the number of direct links between structurally distant tasks and the number of interactions.

The factoring of an organization into a hierarchy of sub-units and tasks implies a mutual dependency of most sub-units on the results achieved by others. Naturally, they are all depending on the performance of their own subordinated units, but even dependencies on nodes in other "branches" of the tree may exist. When designing a sub-unit to a given node, it is rather easy to consider all necessary factors,

all tasks to be performed in order to contribute to the higher-level unit. The sub-unit must receive various goals and constraints and their effectiveness is governed partly by the ability of higher-level designers to assign goals and constraints that will lead to desirable behavior. As an example we can see the establishment of profit-centers in many companies. Here all activities that are allocated to a single profit generating activity are concentrated in one sub-unit. Often the fragmentation is even done by product lines or branch orientation. Each of the profit centers can then be assigned to a sparse number of goals, like profit goals, market share and rate of growth. In an organization fragmented by functional activities, like purchasing, manufacturing, sales and distribution, it might be more difficult to measure performance and to allocate the use of resources. A sparse set of goals may not be able to provide sufficient information to lower-level activities to motivate them to consistent behavior. In this case, relatively abundant constraints must be defined to provide sufficient rules for behavior that contributes to higher-level goal achievement.

### **3.2.12.5. Struggling with organizational design**

The processes of analyzing and designing organizations is far more than a science like mathematics, where a sequence of logical steps is performed and the result will always be the same, if the procedure is followed correctly, even by different people. Performing an analysis includes intuition, the consideration of the dynamic environment and of the culture, that is specific for every single organization. That includes, that heuristics always have to be rather vague and methods are difficult to generalize as well as difficulties in optimizing the sub-unit structure.

Although it seems to be beyond our abilities to design optimized structures, there is no excuse for inaction. A structure will be implemented either one way or the other and it must be the designers attempt to create a structure that is at least better than a structure evolving without any rules and heuristics.

A methodology for design always involves the problemacy of problem solving. Due to human limitations in dealing with a large number of variables at the same time, factoring provides an opportunity to go around these limitations by dealing with a smaller number of sub-

problems at a time. Designing complex organizations builds on the principle of solving local sub-problems, identified by factoring of higher-level problems, and then aggregating them. Under these circumstances, when design becomes a process of nibbling away on the global problem, it becomes difficult to separate analysis and design.

### **3.3. Informatics<sup>4</sup>**

#### **3.3.1. Information (system) architecture**

In 1987, Zachman [ZACHMAN87] wrote that

*an information system architecture represents the total sum of all information related flows, structures, functions aso., both manual and automated, which are in place and/or required to support the relationships between the entities that make up the business.*

Since the use of Information Technology (IT) in administrative organizations became common, different approaches for coping with architectural problemacies have been developed. The need for supporting more and more complex organizational structures, combined with an accelerated pace of technology development has lead to different solutions over time. Ward et. al. [WARD90] has described the development of of IS/IT in a three-era-model, where the primary use of IT differs:

- (1) **Data processing (DP):** Improved operational efficiency by automating information based processes.
- (2) **Management information systems (MIS):** Increased management effectiveness by satisfying managers information requirements.
- (3) **Strategic information systems (SIS):** Improved competitiveness by changing the nature of business.

The objectives of DP-systems and MIS are considered as being sub-sets of the emphasis of strategic information systems, the gain of competitive advantage. A similar categorization has been made by Galliers and Somogyi [GALLIERS87], who have identified the eras of DP and MIS, and the third era of SIS as an emerging phenomenon.

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<sup>4</sup>In this work, the term "informatics" is used as a collective word for the following areas:

- Information (system) architecture
- Information technology
- The use of information technology

They even describe the trends in some particular eras concerning IT and their change over time (see table 3.1.).

<b>Aspects</b>	<b>Era</b>		
	<b>Data processing</b>	<b>Management information systems</b>	<b>Strategic information systems</b>
Nature of technology	*Computers* fragmented	*Distributed process* interconnected	'Networks' integrated
Nature of operations	Remote from user controlled by DP	Regulated by management services	Available and supportive to users?
Issues in system development	Technical issues	Support business user needs	Relate to business strategy?
Reason for using technology	Reducing costs technology driven	Business support user driven	Business enabling business driven
IS characteristics	Regimented/ operational	Accommodating/ control	Flexible/strategic - External?

Table 3.1.

Congruent with the development of the IS/IT eras, different trends in the area of information architecture have arisen. While the 1960s were characterized by large central systems, built around mainframe technology, the introduction of mini- and personal-computers (PC) have enabled the development of dispersed and network systems.

### 3.3.1. Architectural concepts

#### 3.3.1.1. Centralized information systems

Centralized information systems (see figure 3.12.) can be defined as being systems, where all information resources are stored at a single location (database) and controlled by either a neutral department (often a DP- or computer department), or one instance within an area of responsibility [EMERY75], which in turn may contain several areas of activity. However, control remains at a single location, while all users outside have no authority to change the system. All business-units are sharing the same data and software, which is provided through the central system.

Makrygiannis [MAKRYGIANNIS93] summarizes the problems in the concern of centralized information systems as being the following:

- (1) Highly complex and inflexible.
- (2) Extensive costs for maintenance and change.
- (3) Difficult to change.

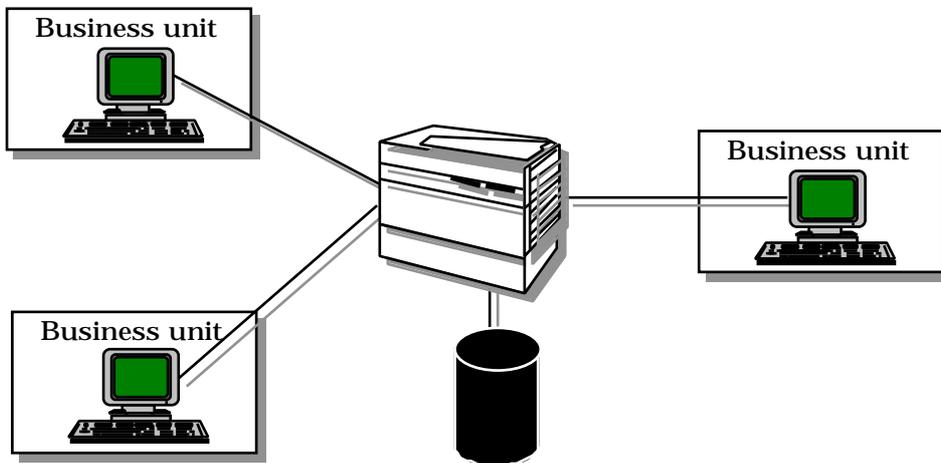


Figure 3.12.

### 3.3.1.2. Decentralized information systems

Decentralized information systems (see figure 3.13.) are based on the principle, that each area of activity owns its own systems. Data storage is local, and interaction between areas of activities is based on CMI - Computerized Message Interaction.

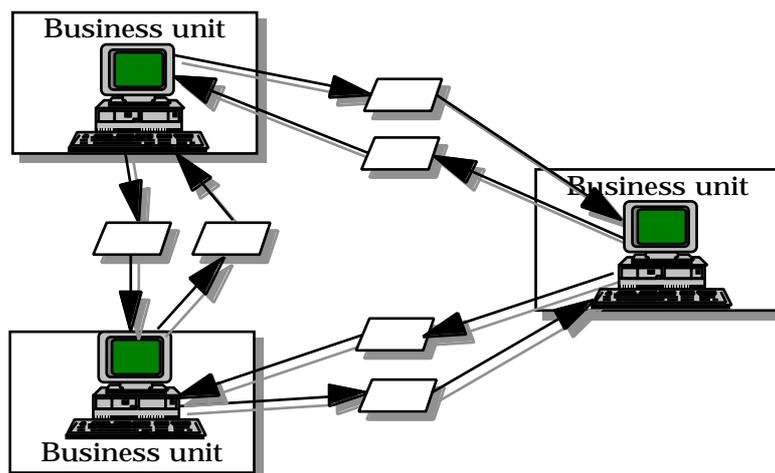


Figure 3.13.

The information stored in the local systems is owned by the respective area of activity and can not be manipulated, or even accessed, by the other areas. Decentralized architectures imply well defined system

boundaries and definitions of the required content and forms of interaction, which is a result of a negotiation process between the concerned sub-units. A decentralized information system has to be conceived as being a system of systems, where the information flow is intended to support the business activities of the entire system, but is processed and stored in the different sub-systems. Decentralized information systems have the following characteristics:

- (1) Internal changes in one sub-system does not affect the others.
- (2) High level of independence.
- (2) Reduced complexity.

### 3.3.1.3. Distributed information systems

Distributed information systems (see figure 3.14.) can be conceived as being a hybrid between centralized and decentralized architectures, though they have characteristics of both types. They are built on the premise, that local data and applications should be stored locally, while information being of common interest is stored in a global database, accessible and manipulatable by all areas of activity. The idea behind this concept is the accessibility of data by areas of activity where it is needed.

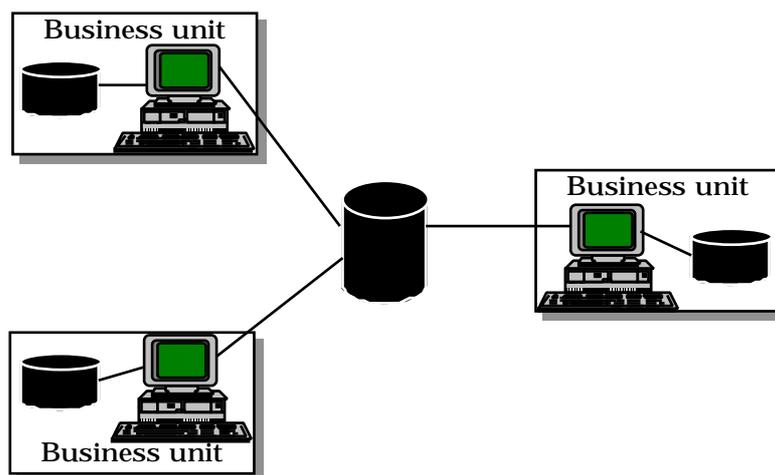


Figure 3.14.

### 3.3.1.4. Information system environments

It occurs naturally, that information systems are no self-purpose, but that they have to serve the organization within they exist. Nolan and Wetherbe [NOLAN80] have described organisations as being composed of two parts, one of them concerned with information management and termed IRM-function (IRM - Information Resource Management), the other one using the information and named information system environment. This environment has to be supported with relevant information by the IS to be able to perform its primary task, the transformation of an input, received from another system, into an output to another system. In value-adding terms, the information system is considered as being a secondary function, intended to support the primary (producing) functions for maximum performance and value-adding effect. This point of view conceives information as being a resource among others, used to produce a company's physical product or service. According to Nolan and Wetherbe, the transformation of resources into products, and thereby the information management, has to be considered in the context of the following organizational issues:

- (1) The goal- and value-system.
- (2) The administrative system.
- (3) The operational activities.
- (4) The psycho-social system.
- (5) The organizational structure.

Any kind of information system development has to be concerned with these organizational issues and determines the IS-strategy, as well as the analysis- and design-processes.

### **3.3.1.5. Wetherbe's architectural model**

J. Wetherby, the inventor of the term "information architecture", is approaching the issues of information from a problem solving side. He claims, that the information architecture can be seen as a map over an organizations information resources, which is independent from personnel, organization structure and the technology used to implement it. Wetherbe's approach to information architecture definition can roughly be divided into five stages.

- (1) Determination of organizational processes.
- (2) Distribution of responsibility.
- (3) Determination and evaluation of information requirements for performing organizational processes.
- (4) Determination of basic information categories.
- (5) Determination of relation between information categories and organizational processes.

According to Magoulas [MAGOULAS91], Wetherbe's architectural model has to be considered as being insufficient, due to the following reasons:

- (1) Its single focus on information architecture.
- (2) The derivation of responsibility from organizational processes as a limitation, due to the crucial task of determining responsibility for cross-functional processes.
- (3) The model's implication of a stable environment and goal-structure, which makes it unsuitable for dynamic environments.
- (4) The independence from subjective images of reality, which excludes the consideration of cultural and political aspects.

#### **3.3.1.6. BPR and information architecture**

M. Hammer considers information technology as being disruptive for existing rules in information handling. However, neither in his book, nor in others, the problemacy of defining suitable information architectures is addressed in a more deepgoing way, while on the other hand information technology and its use are described extensively. So, this paragraph has to be based on the author's interpretation of the writings on BPR concerning information architecture.

The use of shared databases, being proposed by many authors as being a solution to the problem of global data access allows two alternative architectures, either centralized or distributed information systems. In both cases, all parts access the data stored in the common database, the difference is found in the fact that a distributed architecture may allow local systems to have their local data stored locally. The architecture most frequently proposed implies, in other

words, the application of information resource management, as it has been described by Nolan, Whetherbe a.o. However, it may not be denied, that a decentralized architecture might be used from a technical point of view, even if the problemacy of responsibility for information access, ownership and quality still remains, even in this case.

### **3.3.2. The use of information technology**

The use of information technology for gaining competitive advantage and supporting business activities in a dynamic environment has been emphasized extensively during the past years. Some authors to mention, beside the litterature directly focussed on BPR, are Gerstein [GERSTEINXX], Ciborra [CIBORRA92], Harrington [HARRINGTON91], Davidow and Malone [DAVIDOW92], Clegg [CLEGG90], and Keen [KEEN91].

They all point out the importance of modern information technology, but a formal theory for the use of IT can hardly be found there. This section will therefore conatin a more general discussion of the use of IT in BPR.

#### **3.3.2.1. Enabling information technology**

Most BPR theorists and practitioners consider IT as being the essential enabler for any reengineering effort, even if there is a minority claiming, that rengineering can be done without concerning IT. However, it can be stated that IT plays a major role in the majority of BPR projects.

But, using IT as change agent does not mean to throw computers on the problem. They will, in most case, speed up work and lead to temporary improvements, but the root of the problem will not be removed, but temporarily covered.

But, even though information technology can be an enabler, if used innovatively, it must not necessary drive change. As J. Yates observed when looking on the impact of IT development on organizational change, the period from implementation to change can vary significantly in time [YATES89]. Beyond that delay in time, the performed change was often of rather incremental nature.

It may be concluded, that IT is only one of an assembly of change enablers. and if used inappropriate, it might even be a diasbling factor, if exampelwise infological constraints are disregarded, the systems workability is suffering, or wrong technological platforms are used. Beyond that, technology must be applied in an understandable way when trying to link IT capabilities to organizational objectives.

### 3.3.2.2. Disruptive technology

Hammer emphasizws on IT as being disruptive, which means

*"its ability to break the rules that limit how we conduct our work, that makes it critical to companies looking for competitive advantage".*

He identifies eight areas (see table 3.3.) where IT can be used disruptively and roles rules are broken and replaced by new ones. Davenport, on the other hand, identifies nine areas where information technology can be used for business process innovation (see table 3.2.).

<b>Impact</b>	<b>Explanation</b>
Automational	Eliminating human labour from a process
Informational	Capturing process information for purposes of understanding
Sequential	Changing process sequence, or enabling parallelism
Tracking	Closely monitoring process status and objects
Analytical	Improving analysis of information and decision making
Geographical	Coordinating processes across distance
Integrative	Coordination between tasks and processes
Intellectual	Capturing and distributing intellectual assets
Disintermediating	Eliminating intermediaries from a process

Table 3.2.

<b>Old rule</b>	<b>Disruptive technology</b>	<b>New rule</b>
Information can appear in only one place at one time	Shared databases	Information can appear simultaneously in as many places as needed
Only experts can perform complex work	Expert systems	A generalist can do the work of an expert
Business must choose between centralization and decentralization	Telcommunication networks	Business can simultaneously reap the benefits of both
Managers make all decisions	Decision support tools	Decision-making is everybody's job
Field personnel needs offices where they can receive, store, retrieve and submit information	Wireless data communication & computers	Field personnel can send and receive information wherever they are
The best contact with a buyer is personal contact	Interactive videodisk	The best contact with a buyer is effective contact
You have to find things where they are	Automatic identification and tracking	Things tell you where they are
Plans get revised periodically	High performance computing	Plans get revised instantaneously

Table 3.3.

In this concern it is important to point out, that exploiting the capabilities of information technology is no "once in a while" process. The rapid development of IT requires a permanent reevaluation of a companies IT use in order to sustain competitiveness permanently. In the same way as marketing and product strategies are monitored, reconsidered and adapted to environmental changes, IT potentials must gain the same attention and advance to a company's core competency.

However, it is impossible to exploit the opportunities provided by a new technology on a day-by-day basis. Write Hammer & Champy:

*"Companies cannot read about a new technology today and deploy it tomorrow. It takes time to study it, to understand its significance, to conceptualize its potential uses, to sell these uses inside the company, and to plan the deployment."*

But, looking ahead for new technology does not mean to find technologies looking for uses. IT opportunities should be monitored in terms of business applicability and process support and improvement. Information technology is no self-purpose, but a mean to achieve a better competitive position by yielding purposeful application on business problems.

## **4. Discussion and conclusions**

As it has been described in chapter 3, BPR is based on theories from a multiplicity of areas, combining them into a holistic approach to the problemacy of dynamic organizational environments. If we may believe the advocates of BPR, the ultimate solution for increasing productivity and quality while cutting costs at the same, has finally been found. However, it seems worth to approach the BPR concept with a critical attitude in order to identify critical success factors and potential pitfalls.

### **4.1. Discussing the theories**

Above, in chapter 3, three theoretical areas have been described as building the bedrock for BPR. When these theories arised, in the 1930s (organization theory), the 1960s (information architecture), and the 1980s (marketing), they were considered state-of-the-art within their respective areas and are still very strong. But it may not be denied, that they have been critized and it is rather doubtful, if the wheel has to be invented again, and companies experience the limitations of the theories being part of BPR by project failure and high costs.

#### **4.1.1. Limitations of the value chain approach**

Even though the value chain approach provides considerable advantages, such as focussing on customer requirements and broadening the view on a companies relations and dependencies within the industry value system, one considerable disadvantage has to be taken under concern when applying it. The value chain concept has originally been developed for manufacturing companies, but will be more difficult to apply on branches where a physical product can not be found. However, the approach is still workable as customer value adding still is the main task for the company, but it will become more difficult to identify and categorize primary and secondary activities. In the concern of BPR this means potential problems with identifying customer value adding processes, though there is no tangible product to add value to.

## **4.1.2. Discussing organization theories**

### **4.1.2.1. Teams and hierarchies**

It has been stated, that BPR is concerned with flattening hierarchies and putting self managing teams to work which will perform the work processes within the organization. The problems occurring when teams are built have been described by J. Galbraith [GALBRAITH77], where he analyzed a case study, performed in an aircraft manufacturing company. He could identify the following main problems:

- Individuals had problems of first working in a function and then in a team.
- The division of authority between line and team managers was not clearly defined.

The advocates of the "harder" school of BPR will claim, that the total removal of functional structures will solve the problem, but it might be doubted, if the advantages of this view will overcome its disadvantages. According to my opinion, a functional structure is necessary for any organization in order to ensure that functional (specialist) competence is kept and developed. Naturally, the responsibility for operations will have to be moved from the functional line to the process management, but keeping functions as underlying structures may be useful, especially when an organization shall migrate to a process structure, instead of being turned upside down in an ad hoc manner.

Building organizations around processes includes a shift from a functional, hierarchic organization structure to a flat one, based on teams, as it has been described formerly. The general conception is that hierarchies will fade away and be replaced with small entrepreneurial teams that will network for accomplishing business objectives. However, peer-based organizations do not remove hierarchies, they can be found even there and, according to Ralph Carlyle [CARLYLE90], they hunger for bureaucracy.

When formal hierarchies are removed, they are replaced with coalitions, cliques, and power bases, which means, that people invent hierarchies where they can not find them.

Instead of a network of peers, the organizational structure emerging after a hierarchy removal will appear as being an organized anarchy with undefined responsibility rules and informal leadership structures.

Despite these criticisms it may not be denied, that very many teams have been brought to work successfully in different branches. But it is important to point out, that teamwork and flat organizations are not "the simple solution" they are often proposed as.

A second problem concerning flat organizations is the often occurring lack of mutual understanding between the remaining levels. Removing a number of hierarchical levels may, instead of performance improvement, result in increased confusion and goal displacement, if the occurring gap between the remaining levels is not closed by flattening the organization in terms of strategic alignment, the creation of a common frame of reference and mutual understanding (see figure 4.1.). This does even involve broadened task structures for the remaining levels, as top management has to gain increased knowledge about operative work and its problemacies, while the operative level is empowered to take over responsibility roles from the removed levels.

The removed middle management had, beyond supervising the companies operations, even the task of filtering and preparing operative information for the top-management, and transforming strategic directives into operative task and work descriptions. This mediating role can, in large shares, be taken over by information technology given the presumption, that both groups have a common frame of reference.

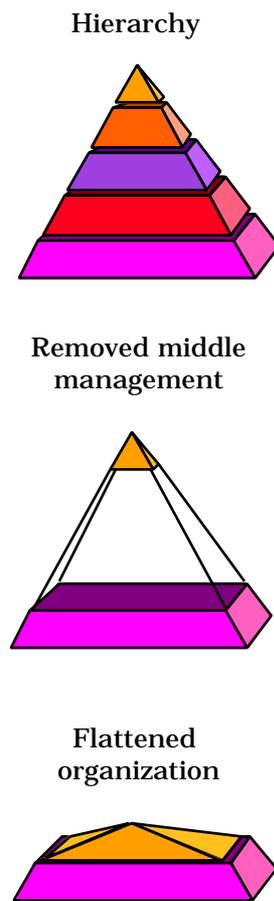


Fig. 4.1.

#### 4.1.2.2. Centralization and decentralization

BPR emphasizes the decentralization of decisions within the organization, i.e. that process managing teams shall take all decisions, directly concerning "their" process themselves, as long as

they are kept within the strategic frame defined by the company's top management.

This view is rather congruent with the trend towards decentralization during the 1980s, when a wave of decentralization swept over organizations in most branches. Companies were divisionalized and decision power was brought down within the still existing hierarchies. This has led to cooperation deficiencies among the units, and it is reflected by examples like Volkswagen, where new engines were developed simultaneously by the mother company Volkswagen and its daughter-company Audi. It was estimated, that the total lack of coordination led to costs of approximately 200 million marks (200.000.000 DM).

So, it may be wise to decentralize and bring decision taking to the actual decision points in the organization, but the need for a centralized instance for coordinating activities within different units (or processes) must not be underestimated. Said Willem Roelandt, vice president and general manager of Hewlett Packards Co.'s Computer Systems Group: *"People will still be decentralizing, but with more limited degrees of freedom."*

There might be a risk, that totally process-based organization will end up in a situation, where coordination among processes is insufficient, due to the missing integrating role of middle management, that often is removed as a result of BPR efforts. Naturally, decisions on operative level can be taken by empowered employees, but relating them to the overall strategic framework of the organization is still a rather complex task.

#### **4.1.2.3. Organizational culture and power**

Bringing decisions down into the operative organization is an important issue of BPR, but it is, at the same time, neither simple nor quickly achievable as it requires skilled employees which not only possess the formal competence and education to take decisions, but even the will to do so and to take the responsibility related to it. This requires firstly the training and education of existing employees for enabling them to align their own work with the organization's strategies and secondly, if new humans shall be integrated, the recruitment of people with high skills within the area they will work

in. Beyond that, all employees must have adopted the organizational culture in order to reduce conflicts and provide a behavioral framework for the activities to be performed.

The necessity of a common organizational culture has been a major issue in management literature during the 1980s and is still going strong in the BPR concept. To be incorporated in the organization by cultural means is considered as being a presumption for being able to perform work without extensive supervision and control mechanisms. However, the issue of corporate cultures is difficult to assess, though an organization constantly not only has an "official" corporate culture, but an assembly of sub-cultures and unofficial power bases and interest groups. To align these interest groups with the strategies of the organization as a whole is a major presumption for empowerment and decentralized decision taking as it is implied by BPR.

#### 4.2. BPR and quality

During the late 1980s, the concept of total quality emerged and is now widespread over a multiplicity of branches. TQM - Total Quality Management and BPR share a lot common themes as they both focus on customer requirements and processes to fulfill them, however, they differ significantly as the pace of change and improvement is concerned, as well as on the means of accomplishment.

While BPR is intended to achieve quantum gains rapidly by replacing old processes with new ones, TQM and other quality programs are working on the basis of existing processes and seek to enhance them by incremental, continuous improvement, a process even known by the Japanese term "kaizen".

As it was shown in chapter, where a sample methodology was presented, BPR and total quality programs must not necessarily exclude each other, but can be used as complementary concepts, aimed to provide an improvement based on rapid process changes as well as on steady improvement of the new processes.

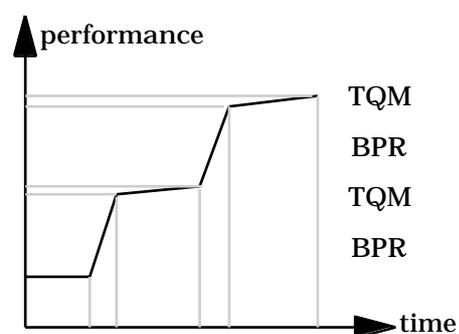


Fig. 4.2.

Davenport identified four alternative approaches to integrating improvement (TQM) and innovation (BPR) activities, in order to provide a single, coherent program of organizational change [DAVENPORT93-2]:

- Sequencing change initiatives
- Creating a portfolio of process change programs
- Limiting the scope of work design
- Undertaking improvement through innovation

Even though other authors are supporting a combined application of both approaches, emerging from cooperation between quality and reengineering advocates, as the best solution for achieving a maximum of improvement<sup>5</sup>, this point of view has not become a commonality on the BPR community yet.

The differences between TQM and BPR efforts can be summarized by the following table (based on table 1-3 in [DAVENPORT93]):

	<b>TQM</b>	<b>BPR</b>
Level of change	Incremental	Radical
Starting Point	Existing process	Clean slate
Frequency of change	One-time/continuous	One-time
Time required	Short	Long
Participation	Bottom-up	Top-down
Scope	Narrow, functional	Broad, cross functional
Risk	Moderate	High
Primary Enabler	Statistical control	Information technology
Type of change	Cultural	Cultural/structural

Table 4.1.

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<sup>5</sup>The need for combining BPR and TQM was pointed out in 24 articles of the 379 revealed.

### 4.3. Conclusion

In the chapters above, the concept of Business Process Reengineering has been introduced and related to existing theories within three areas - Marketing, Organization theory and Informatics -. It has been shown, that much of BPR can be deduced from existing theories within these areas.

As a final conclusion, I would like to compare the characteristics of a traditional and a modern company<sup>6</sup>. Using these terms, a traditional company is defined as being a company that follows traditional rules, using traditional hierarchical structures and control systems and applying information technology for supporting their activities within those structures. A modern company, on the other hand, is customer-focussed, process-based, and using IT as an enabling factor for organizational change and the gain of competitive advantage.

Many companies in the western hemisphere have discovered the need for turning themselves into modern companies, often forced by the economic regression sweeping over many areas worldwide. The recipes for facing the challenges put by environmental dynamics are many, and Business Process Reengineering is one of them. However, contrarily to many of the current approaches to change, which often emphasize on business or technology or quality, it provides a holistic approach and emphasizes the necessity of combining all the above mentioned factors.

The figure below describes eleven of characteristic factors that can be used for distinguishing traditional and modern organizations and how they are looked upon. The list of criteria has no claims of being complete, but includes, according to my opinion, the most relevant aspects to be considered as far as the aspects of organizational change from a traditional to a modern organization are concerned. It can be stated, that far more research has to be performed to enable us to gain a more holistic understanding of organizational and environmental dynamics, and this work is intended to be basis for further research efforts into this direction.

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<sup>6</sup>Instead of "modern", some people would prefer to use the term "postmodern". However, this distinction will not be discussed here. The term "modern organization" is simply used for making a difference to the type of organizations we have seen until now.



**Traditional organization**



**Modern organization**

Strong hierarchy	Hierarchy	Small management levels, flat structures
Bureaucratic, centralized decision taking	Delegation	Delegation to concerned levels, self-responsible
Clearly defined functional tasks	Labour division	Interdisciplinary teams, working groups
Low, no immediate feedback	Flexibility	High, learning organization
Technology driven, functional	Development	Customer driven, concurrent
"Jumps", technology driven	Improvement	One time & continuously
Immanent through low responsibility	Waste	Continuously decreasing
High costs, buffers high stocks	Warehousing	Production on request, "just in time"
Quality end control, "fixes"	Quality	Total quality
Fixed	Working time	Flexible, time accounts
Supportive	IT - use	Innovative

Figure 4.3.

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