

## RELATIONSHIP OF BPR AND THE APPLICATION OF INFORMATION TECHNOLOGY IN THE ESTABLISHMENT OF NEW OPERATION MODEL OF ENTERPRISE

Shao-zu Mei, Xiao-xia Huang, Jian-zhong Feng  
School of Management, University of Science & Technology Beijing,  
Tel: 8610-62334173  
EMAIL: MEI\_SZ@yahoo.com, HUANG824@sina.com.cn

### Abstract

The increasingly developing information technology and the widely application of it bring an information revolution which results in a social revolution. This requires that our enterprises establish a new model which suits the competition of new information society. BPR---business process reengineering is introduced in this wave of information revolution. Information revolution is the source of the development of BPR. IT is the pushing power to implement BPR and the powerful tool to help enterprise complete their reform. In the process of business process reform of the enterprise, we must make full use of the pushing power of IT to help the enterprise better plan their business process. In the meantime, when making information plan of the enterprise, we must fully take into account the various reform changes of the enterprise brought by BPR and apply information technology with an attitude of searching the new and searching changes. Thus, doubly driven by IT and managerial thinking of BPR, combination of IT and managerial thinking can be better reached and the perfect operation model of the enterprise can be created.

### 1. USING IT TO DRIVE BPR

#### 1.1 Apply IT to better business process of enterprise

In traditional operation process of the enterprise, there exist routine work flow, material flow and capital flow. By establishing intranet of the enterprise to connect with internet and applying a variety of office automation software and application software, information flow can efficiently replace the above mentioned three

flows, integrate these three flow to one information flow, eliminate the unnecessary procedure existing in these three flows, clear up the procedures that bring no value appreciation to enterprises, and integrate and better business process to make information flow directly reflect the value flow of the enterprises.

First, information flow can completely replace routine work flow and capital flow, eliminate the errors happened in people's communication and cancel various commercial documents to deal with business quickly, conveniently and automatically.

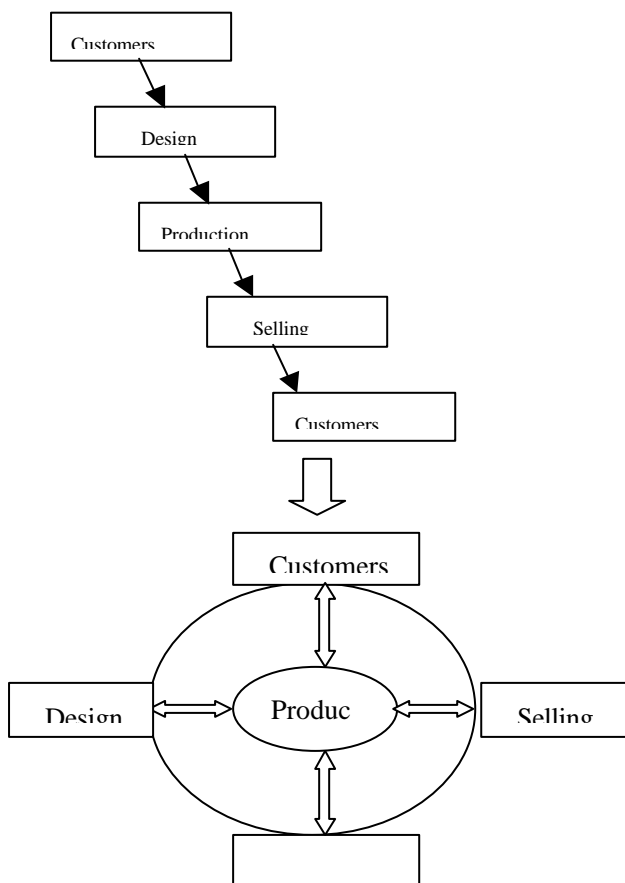
*In early 90s, though there were 500 people in the accounts payable department in North America, suppliers usually complained that payments were delayed and usually not in accordance with the goods. Through analysis, Ford found that payments were given when purchasing order, receipt and suppliers' invoices matched. Most working time of clerks was spent on checking of these documents. By using IT, Ford reengineered its business process, established no document required business dealing system. The number of items to be matched was reduced to three and purchase order and receiving confirmation were input to a computer system and matched electronically. 75% reduction of labor in headcount in account payable was realized, efficiency and quality were increased and accurate financial information was available for decision department to make decision[1].*

Using IT to carry out internal EC can automate and standardize the original manually dealing process which is not standard. Establishing business handling process supported by information system based on data bases and applying a sharing data bases based on internet can change the series connected business handling model to parallel connected business handling

model and speed up the response speed. Changing the original periodical business dealing style to on line handling all the time style based on net data bases can update information timely. Realizing mutual connection of intranet with internet can change the original low-efficient, high-cost communication method such as meeting , telephone and travelling out on business to high-efficient but low cost e-mail method.

IT can change the original business process from straight line model to the following and reflecting all the time model. For example, traditionally, in the selling process of a product, there is a sequence of market investigation, design , production, and selling to the customers. Influenced by change of supply and demand of the market, customers' various selection and selection mutability, often the manufactured products can not catch the fast changing market, and it can not reflect the customers' demand. Therefore, this model can not gain the anticipated profits, and a great deal of people' effort, material, capital is wasted. Now, if we use IT and relative equipments,

**Chart 1: change of business process brought by IT**



internet can link the customers with enterprise's design, production, sales, and financial section. When design department have designed an embryo of a product on the basis of market investigation, customers can comment on the embryo by means of net intermediary or other method. In the meantime, production department evaluate the production possibility of the product, financial and sales department anticipated the possible cost and the market bearing ability to forecast whether the product will sell well(see chart 1). In this way, judgement on whether the product should be put into large-scale production can be made before the samples have been manufactured. At the time when lots of people's efforts, material and capital of the enterprise are being avoided, production period is greatly shortened and market demand is quicklier and more accurately mastered.

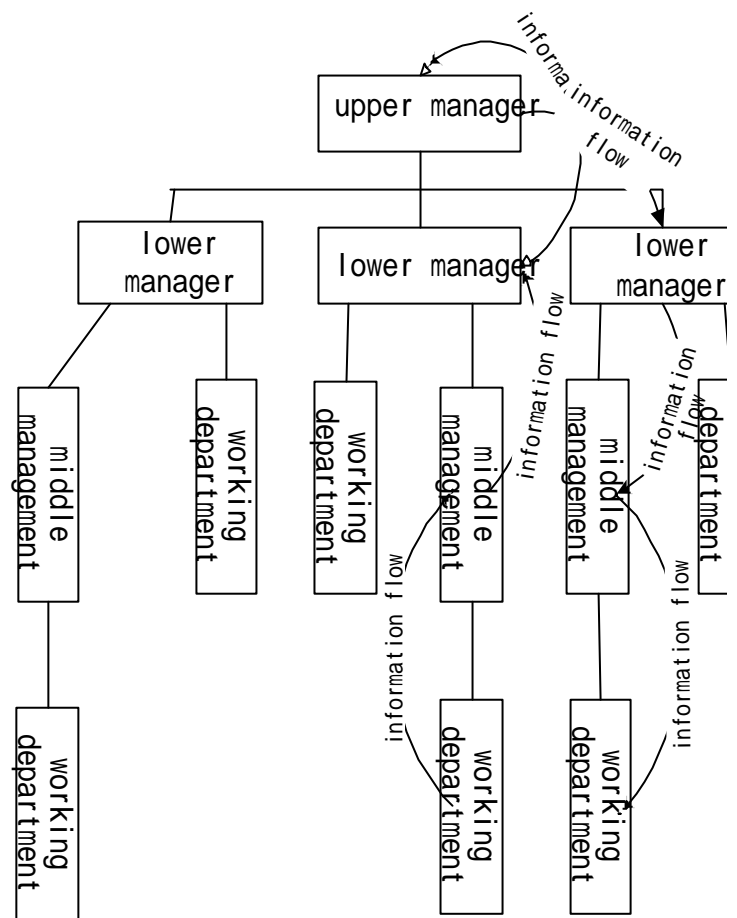
**1.2 Using IT to better organizational structure of the enterprise**

Limited by individual ability of dealing routine matters and information, traditionally, there exist many overlapped departments and some middle management levels to complete the task of passing the upper information to the lower, or vice versa. Organizational structure is usually divided according to business content and department function. For example, organizational structure is usually divided into supply, sales, production, management, financial and personnel department. The departments usually deal business within their department, lacking communication between and among these departments. In order to coordinate all these departments, some middle management levels have to be needed, swelling the whole organization and increasing non value added procedures. Using IT can bridge all the departments by net communication. Through various kinds of office software and net communication equipment, information exchange between individuals and departments can be realized. Furthermore, enterprise can establish its own information system to help complete the operation of the enterprise. The execution of

internal EC will inevitably integrate and re-organize the internal organization, structure, and function of the enterprise in a wide scope. Organizational structure of the enterprise will change from the vertical and ladder type to flat type. Everyone can communicate with his colleagues and the managers through internal net. The middle managers that pass the upper information to the lower or vice versa will finally be substituted with EC system. As shown in chart 2, the original department structure divided according to function of the enterprise has changed according to business process. This kind of structure can not only increase the efficiency of the whole enterprise, but also can avoid errors happened in middle procedure which cause the process work unsmoothly. Many facts have shown that value appreciation of product comes little from product itself but mostly from auxiliary operation and services of the product. Take railway ticket selling in Beijing as an example. In the past, in order to realize co-ticket selling at Beijing station, Beijing west station, and Beijing north station, many people are needed to follow the unsold ticket to various cities and do statistic work of it. Besides, many middle managers are needed to communicate among stations. There exist lots of waste of people and work and many unnecessary middle procedures. By establishing co-ticket selling system, ticket selling information in different stations can be obtained all time by sharing the same data bases. Better and faster services are given to customers. The original middle managers that are responsible for communication among the stations lost their function. The organization is integrated and the enterprise operates flatly.

When doing business electronically, some departments can be lessened and eliminated. Some can become independent in the supply chain of the whole society. These departments are usually very

specialized and run efficiently. Accountant office, Law office , some special purchasing companies and some marketing companies are examples of them. With the help of extranet/internet, an enterprise can establish good friendly co-operation relationship with its upper and lower enterprise, regarding them as part of organizational net system. Thus, resources can be shared, information can be transmitted fast and accurately, operation efficiency can be raised and after-sale services are improved.



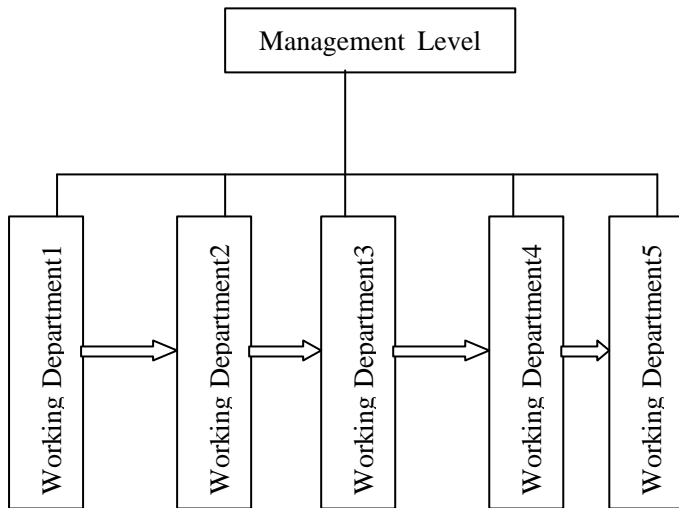


Chart 2: change of organizational structure brought by IT

**1.3 Using IT to help integrate the enterprise with outside environment**

Information technology will gradually permeate all aspect of social economy with the wide application of net and the integration of global economy. Traditional competition has changed dramatically both in content and in form. Traditionally, we see competition from the point of product and market. If your product or service is superior to your opponent, you are the winner, and will win the market. Product and service are still important. But with the wide spread and going deep of EC, the changing and variable market demand asks stricter and higher requirement on production organization, design and craft. Speed becomes faster and faster, and trade becomes more and more transparent. Traditional enterprises that run independently in a unit like a family will face survival crisis. Enterprises will have to co-develop with other enterprises, competing but also co-operating because enterprises and their upper suppliers and lower customers are not ordinary business partners, but co-operative friends that have common benefits[2].

Social revolution brought by information revolution requires global economy complete a new round of adjustment in industrial structural and social division at electronic era. Pursuing of maximum profit will finally result in a formation of a new social average profit. Social division requires us to decide the role of the enterprise in the production of value chain at a more specially

prospect. Darwin’s creature innovation theory proves the survival of the fittest of the creature. For the same reason, in economic field, we require better production value chain to service our society with faster speed and better quality of product. This asks that every production procedure of different industry reach a stage of being able to exchange information accurately and timely. Without the support of IT, this is unavailable because of the limitation of geographical seperation and information barrier. The development of IT builds a safe and convenient bridge for enterprises. The enterprise can connect with internet through intranet to exchange information and do business with potential business partners all over the world. Enterprise can even establish a data bases with its suppliers to exchange information and communicate quickly. For example, . Wal-mart company make it available for its suppliers to follow its stock at any time and voluntarily supply goods to Wal-mart to help it arrange its stock. The suppliers substitute Wal-mart’s stock arrangement schedule with the stock following and order placing system, making the whole supply and sale chain more appropriate.

**1.4 Using IT to help solidify the culture after reform**

Enterprise culture is the sum total of spirit asset and material asset that have been created in the process of production by this social organization of enterprise. Operational philosophy and enterprise spirit being its core, operation activity of production, organizational regulation system, physical environment and behavior image being its carrier, it combines material culture, organizational regulation culture with spirit culture theoretically[3]. BPR as a kind of revolution thinking, is also a culture. It asks an enterprise to learn continuously and to search and absorb the new and the change to adapt the new environment. The formation of culture needs sinking and accumulation. So does the culture of the enterprise. To reach the aim of the revolution of enterprise, advantages of new business process

and new enterprise culture must be proved. But the reform of the enterprise is a long process. The achievement of reform is stall in time and is hard to show its effectiveness at once. Sometimes, the achievements of the enterprise may even go backwards temporarily. Therefore, the new culture formed from reform of the enterprise at a short time is liable to be pounced on by the old culture. The application of IT in enterprise can let the clerks well enjoy the great convenience brought by IT. When they have enjoyed the increased efficiency and the convenience, the clerks will voluntarily regard learning IT as part of their work, thus cultivating a kind of information culture, and strengthen the achievements of reform. The information culture has functions of 1) guidance 2) binding 3) cohesion 4) merging 5) radiation. Information culture as part of enterprise culture at the time of reflecting the characteristics of IT, acts as catalysis and binder in the formation of BPR culture, and can better strengthen and perfect the result of revolution of BPR.

## **2. USING BPR TO PUSH THE AUTOMATION OF ENTERPRISE**

### **2.1 BPR is helpful for enterprise to make automation plan**

The idea of BPR was born in information era. It includes much excellent management thinking of the past. BPR asks we stand at the strategy height and stand in the front of information society to reform our enterprise, making it meet the competition demand of information era and net economic era. Though BPR does not provide specific revolutionary method or tool to reform our enterprise, it input a new thought into the reform, and give a new direction to reform. That is to combine reform of enterprise and application of IT at the direction of EC and net economy to adapt the competition requirement of net economic era. Just as Marxist philosophy is the summary and distillation of all other natural science, social science and politics, BPR is from information era, and will serve the information era. It is of vital

importance to the revolution of our enterprise , and has an active directory role in the automation plan of an enterprise.

In the past, when our enterprise makes automation plan, usually it only automate and computerize the original business process, which can not well support the future operation of the enterprise. Besides, when making automation plan of the enterprise, designers usually design the automation system model according to department function instead of business process, making the application of automation only automate some specialized procedures of the whole process which form many isolate island of automation. Information does not really flow.

Reengineering the enterprise to make process as its center and creating new reengineering culture of enterprise first before making automation plan can better propose the requirements that enterprise needs, and can better design the future application plan of automation.

### **2.2 BPR helps enterprise to carry out automation plan**

When an enterprise carries out automation plan, IT itself will impact on the business process, organizational structure and the culture of the enterprise. If there is no good planning, even though all the software and hardware are well prepared, the real application of automation plan is hard to well carry out. Thus not only the operation efficiency of the enterprise can not be increased, but also the execution of IT becomes an extra burden to enterprise. Nowadays, there are many enterprises that are trying to apply ERP system, but few of them have realized that ERP itself includes many management thinking. Only when the enterprise has fully reengineered itself, and has created a new operation model according to ERP can the enterprise finally reach its goal. At present, only a few enterprise that has applied ERP has reached its anticipated goal. The key reason is that they did not well keep its relief of their business reengineering.

Enterprise's carrying out BPR can help it better

realize the goal of automation plan. In the process of carrying out information plan, if enterprise run BPR thinking through the whole automation process and fully consider the changes that may happen in its business process, organizational structure and enterprise culture etc., it will actively provide strong support to the application of automation plan instead of passively receive enterprise's automation process. Then the anticipated goal will be better reached.

### **3. REENGINEERING OF BUSINESS PROCESS AND THE AUTOMATION PROGRAM OF ENTERPRISE ARE COMPLEMENTARY TO EACH OTHER**

#### **3.1 Applying IT to carry out BPR**

The appeal for revolution to enterprise brings a wave of business process reengineering to enterprise. In America, many big famous companies like General Motor, Detroit Company, Cisco, and Dell have carried out BPR. Chinese consultant companies and plot hatching companies are booming in this wave too. At a time, enterprises all give their money to consultant company asking for their business process reengineering.

The early practice of BPR got succeed to different degree. But the enthusiasm and the expect for BPR decrease recently. According to one investigation of American Deloitte & Touche , most companies that have executed BPR got result less than what they had expected. There are many reasons for it. Among them, one very important reason is that they were not aware of the characteristics of this information era, and did not fully make use of the great power of IT to push BPR.

Information revolution brings BPR, therefore, the execution of BPR must be with the help of IT. BPR must be executed according to the final net economy. Otherwise, it will not really succeed. This is determined by our era---information era and our society---information society. One must be aware that IT is the pushing power to BPR and

the execution of BPR must be supported by IT. America is the predecessor of BPR. They have many successful experience as well as much failure lessons. Their experience and lessons all tell us that in order to fulfill the aim of BPR, IT must be taken as an active factor and a powerful tool. Reform of enterprise purely promoted by CEO or management leaders but ignoring the active power of IT is not suitable. Revolution of the enterprise must be prompted and taken part in by CEO together with the help of IT.

For example, in order to increase the efficiency of the enterprise, procedures need to be integrated and eliminated to clear up the unnecessary procedures and path. This is impossible without IT. Limited by the ability of mastering and applying information, the width of information spread is in inverse proportion to depth of it. If information needs to be spread laterally, many middle people must be needed to pass and exchange the information. On the other hand, the deep spread of information requires a middle management level to pass the upper information to the lower or vice versa. These procedures and persons are needed without the help of IT. Information technology and the relative equipment can simultaneously increase the depth and width of the spread of information. For instance, we can use post serve system to pass and exchange information within the enterprise. Information can be shared and thus help increase the usage of information, help avoid repetition and therefore help avoid repetition procedures and process. For this reason, to reach the goal of BPR is to fully make use of IT, and take the development of EC into account.

#### **3.2 Automation of enterprise can not be well completed without the guidance of BPR**

Using IT can greatly increase the operation efficiency of the enterprise, the market competition ability, and the ability to quickly catch the market information and respond to it. Early construction of information system pay attention only to the automation and computerization of the original business process,

took little into account the whole direction of using computer and MIS in the enterprise. There is hardly any cooperation between or among the departments. Each department exploits and uses its own system, and most datum are limited within the department, resulting in many repetition information and resource waste of datum processing. With the development of software project and improvement of information process technology, construction of MIS system becomes mature. We experienced MRP, MRP , ERP and MIS system. So far the application of them has not obtained enough good result. This is mainly because the construction of MIS system in the enterprise is mainly from technological prospect to automate the original manually handled process, and does not take into account the fact that information revolution asks all enterprise to establish new organizational structure, new operation model and new process style to adapt the information society. The most advanced technology can not bring the best achievement of the enterprise. Practice proves that pure automation of the original process will not succeed. For example, before reengineering, Ford employed about 500 people in the accounts payable department in North America. The business is many and diverse. By establishing ERP system, labor strength was reduced, efficiency was increased, and the clerks were reduced by 20%. Then Ford was astonished to discover that Mazda, in whom they had 22% stake, did the same job with only 5 people! Even after allowing for scale difference between the two firms, Ford need at most 100 clerks. Therefore they began reengineering. By integrating business, adjusting the order and method of business dealing, they reduced middle procedures, greatly increased efficiency and reduced 75% of their clerks. Ford example well illustrated that pure instruction of information system does not work well, that integration of information datum and program model must be compatible with BPR.

The application of IT must meet the demand of future development and competition. Simple

automation and computerization is not the real automation of the enterprise. Otherwise isolate island of information is liable to be formed, and the future development of the enterprise will likely to be obstructed instead of being promoted. We must stand at the height of information era and information society, consider the future demand of development and competition of enterprise, and combine the front management thinking with the advanced information technology on the basis of enterprise reform to well reach the aim that IT serve the reform and development of the enterprise and reform and development of the enterprise guide the application of IT. Execution of BPR can not succeed without the aid of IT and EC. IT and EC as a strong power to push forward the information era and information society support strongly the execution of BPR . In the practice of applying BPR, we must fully be aware of the powerful function of IT and EC and make full use of them to help enterprise integrate and better its business process.

### **3.3 Mutual promoting relationship between BPR and IT**

We are in an era of information and revolution. Our enterprises are facing a revolution in information era. Revolution of enterprise asks us to establish a new operation model that adapts the needs of competition in information society.

On one hand, IT brings BPR and provides powerful tool to help complete BPR; On the other hand, BPR can well guide and strongly support the execution of automation plan in enterprise. Without IT, BPR will fail. Without the guidance and instruction of revolutionary thinking, execution of automation plan is hard to realize its real aim. Therefore, in the process of automation, enterprise must fully consider the changes brought by IT, and think how BPR can actively guide the planning and execution of automation. When it reforms the enterprise, enterprise must fully consider the power of IT, and use IT as a strong pushing power to push the reform of enterprise.

In one word, we are in a revolutionary era. Enterprise must follow the trend, and reengineer itself with the aid of IT. IT and BPR must promote each other and support each other. Only in this way can enterprise really realize its reform goal in information era.

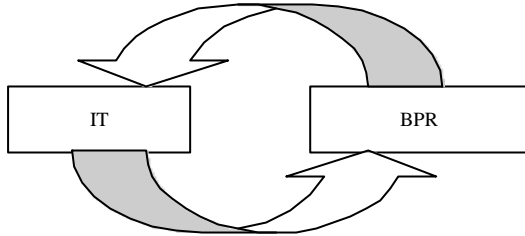


Chart3 mutual promoting relationship between BPR and IT

- [1]Joe Peppard, Philip Rowland . Business Process Re-engineering. Prentice Hall Press
- [2]Cai-guo Xu. China Commerce Dictionary. Tongji University Press
- [3]Chun-chang Liu. Electronic Commerce. China City Press