Implement BPR and CPI to optimize the process of getting medicine in pharmacy: a comparison between Sweden and China

Jingya Dai
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List of abbreviations

BPR: Business Process Reengineering
CPI: Continuous Process Improvement
PRLC: Process Reengineering Life Cycle
TQM: Total Quality Management
IS: Information Systems
IT: Information Technology
ICT: Information and Communication Technology
SMS: Short Message Service
Abstract

This report generally focuses on the process of getting medicine from the pharmacy in the hospital. The processes are different in Sweden and in China due to the different concrete conditions. Compared with the Swedish process the Chinese flow lags fairly far behind. To optimize the Chinese process by taking advantage of the Swedish process is the intention of this report; it also gives the advice on how to improve the performance for the Swedish process. By comparing the multiple theories for process improvement, I used Business Process Reengineering (BPR) theory to reengineer the Chinese process and used Continues Process Improvement (CPI) theory to ameliorate the Swedish process. The differences between BPR and CPI are also revealed in this report.

Key words: Getting medicine from the pharmacy, Business Process Reengineering (BPR), Continues Process Improvement (CPI), Patient Satisfaction, Improve, Challenge..
Acknowledgement

Without the help of certain people, my thesis would have never been completed. I want to take this opportunity to do the appreciation.

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In addition, I thank Carin Svensson, Carin Tors and Susanna Malmqmist, the staffs in Apoteket, they accepted my interview patiently and provided the data that I need.

I also want to thank the other students for their fine suggestions for my thesis, especially my two Swedish friends, they helped me to accomplish the interview and do the modification.

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Växjö, Sweden.

Jingya Dai
Chapter 1 Introduction

Nowadays, customer satisfaction becomes to the one of the most important goals for the companies. Thus, improving patient satisfaction is deemed to the essential aim for the hospital. Due to the different situations and culture of the different counties, the results of patient satisfaction investigations (which will be mentioned in Chapter 4.2.1.3 Process diagnosis—questionnaires) are also different.

What causes the patient satisfaction so different? How to improve the patient satisfaction? In order to answer these two questions, I will do some comparison between Sweden and China, and then present two process management methods, BPR and CPI, to ameliorate the current process in the hospital.

1.1 Background

1.1.1 The situation of pharmacy in Sweden

“Apoteket is the national pharmaceuticals retailing monopoly in Sweden, it is a government owned enterprise reporting to the Swedish Ministry of Health and Social Affairs.” (Apoteket AB. 2005, P1)

Apoteket is owned by the Swedish state and is non-profit-orientated, it is an individual sole retailer for medicinal products relating to the hospital but doesn’t belong to the hospital. Such conditions force Apoteket to contribute to the patients, its foremost task is not to gain profit, but to make sure the patients get the right medicine in the right quantity and at the right time.

1.1.2 The situation of pharmacy in China

The situation of Outpatient pharmacy in China is totally different from the one in western country. The Outpatient pharmacy and the hospital are an integer, it belongs to the hospital. Although the hospital is a non-profit-oriented organization and is owned by the Chinese state, it has to earn money to support the business operation by itself, inasmuch as China is not such a welfare state as Sweden, the funds from the government are limited. Consequently the outpatient pharmacy included in the hospital is a profit-oriented department. It is unkind to the patients, the hospital gains
profit from selling medicine; in addition, the patients have to pay a high cost for the medicine.

Although the patients can hold the prescription to get the medicine from the drugstore outside of the hospital, they do not do that often.

Reasons:
- Sometimes, there is no medicine in the drugstore outside of the hospital that mentioned in the prescription.
- It is convenient for the patients to get the medicine in the hospital
- The pharmacy in the hospital is more reliable.

1.1.3 The history of BPR

How to increase productivity, provide higher levels of service and responsiveness, and reduce cost simultaneity is the primary problem impact on business. The traditional organizational structures, customer service philosophies, and business methods are no longer competitive in today’s global market. Nowadays, an organization needs to be customer-focused and market-driven in external relations and process-focused and team-oriented in internal operations. Business Process Reengineering (BPR) is such a method to resolve these problems.

Business Process Reengineering is a concept of business in 1990s, BPR originated from Total Quality Management (TQM) philosophies of Joseph Juran and W. Edwards Deming. TQM clearly focus on processes (David K & Henry J, 1995). Figure 1 is a timeline which puts the birth and development of TQM.
1.2 Research question

- What is the difference of the process in getting medicine from the pharmacy between Sweden and China?
- How to optimize the Chinese process by taking advantages of the Swedish process?
- How to improve the Swedish process?
1.3 Purpose

To improve patient satisfaction as well as the quality of service in pharmacies, I started this investigation. In addition, as the number of private pharmacies increase, to intensify the competition of the outpatient pharmacy in the hospital is essential. The purpose of my paper is to use the BPR method to improve the Chinese process in getting medicine from the pharmacy by taking advantage of the Swedish process. In addition, implementing CPI to ameliorate the Swedish is also required.

1.4 Stairway

The investigation of this report is a step by step process; I view it as a stairway.

![Thesis stairway](Source: Own creation)

Figure 2

Figure 2 Thesis stairway (Source: Own creation)

1.5 Limitations

For the investigation, I implement the BPR method as the main theory in this thesis. Maybe there are other methods that are better and can be used in this paper but I chose the most familiar one. Actually, BPR is not such a mature method, it is just a
managing idea, and not all the companies who implement it will achieve success. What’s more, due to the characteristic of BPR—drastic change, BPR turns to a costly way to reengineer. Thus I only regard BPR as a thought way to analyze the process, it is necessary to combine other managing methods with BPR, or else, the company which implements BPR won’t achieve success.

My thought way is also limited. Even the theoretical data and empirical data are the same; the result may be different due to the different experiences, logics and capabilities of researchers. Therefore, the result of redesign and the opinion on future research all come from my idea. I will try to analyze it objectively.

Due to my stay in Sweden during the research period, I could not interview a Chinese pharmacy face-to-face in China, and the interview way was done via internet. Compared to the face-to-face interview in Sweden, interview via email is not elaborate.

1.6 Time frame

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*Figure 3*

Figure 3 *Time-frame of the thesis study (source: Own creation)*
Chapter 2 Methodology

This Chapter which method I used in this thesis and how I analyzed the data.

2.1 Research Model

I followed the Jenkins’ model of the research process contains 8 sequential steps:
1. Idea
   2. Library research
   3. Research topic
   4. Research strategy
   5. Experimental design
   6. Data capture
   7. Data analysis
   8. Publish result

*Figure 1* Jenkins’ model (Pertti Järvinen, 2004, p3)

As a matter of fact, I did not know how to commence my thesis in the beginning; this model enlightened me a lot. Each step designated the mission that I should finish in different periods of time. As the saying goes, the first blow is half the battle. I benefited from this model.

2.2 Research Journey

It was a hard process to decide the final topic. By considering all the areas that are optional, I chose the health care domain. It is more interesting than the other areas I think. What’s more, it will be significant to do the research in this area for China.

Which part of health care should I investigate? This question puzzled me for a long time. I tried to find some inspiration from searching vast numbers of articles, databases and information. Finally the process of how to get medicine from the pharmacy attracted me. Although there are many processes in the hospital, how to get medicine from the pharmacy is the most frequent one as well as the most familiar one.
Linda, my supervisor, had greatly inspired me. She asked me to do the comparison between Sweden and China in this process. My thought way had totally expanded by her suggestion. This part is about the case study, it will be mentioned in chapter 2.4 Case Study.

After having decided on two pharmacies, I tried to search some theories about the interview from the internet which could help me to prepare the interview questions. I did my endeavor to search the theories to support my thesis meanwhile. Finally, my choice fell on Business Process Reengineering (BPR). Maybe BPR is not the only one or the best choice to be implemented in the research, but BPR is familiar to me,

Searching methods for my thesis was a very meaningful journey, I could learn much from it. After I met my supervisor in April, the concept of Continues Process Improvement (CPI) was born in on me. It is similar to BPR but actually totally different. To find the differences between the two theories and to implement them into the accurate situations became the most important task in that period. Both the BPR and CPI conceptions were used in this thesis.

2.3 Preunderstanding

The conception of preunderstanding indicates people’s insights into a detailed problem and social environment before they start an investigate program, it is an input. (Gummesson, E. 2000)

Preunderstanding usually appears in form of theories, models, techniques, but mostly researchers do not have practical or institutional knowledge. (Gummesson, E. 2000)

It is determined by general knowledge of theories and techniques and specific knowledge of institutional conditions. What’s more, the personal attribute can affect the preunderstanding, such as intuition and creativity. (Gummesson, E. 2000)

Preunderstanding means the knowledge of people insights and experience before they get involved in an investigation activity. So the preunderstanding does not only mean the knowledge researchers have before they begin to collect data, it also includes the
personal experience they have before entering the research. *(Gummesson, E. 2000)*

![Diagram showing sources of preunderstanding](image)

**Figure 4**

*Figure 4 Sources for preunderstanding. (Source: Gummesson, 2000.)*

As shown in figure 2, preunderstanding is composed of two elements, first and second hand. First hand is the knowledge you already have about the topic from your own experience. Second hand is getting the knowledge from others through textbooks, reports or lectures.

During the university studies, I have comprehended the knowledge in my major. It helped me to find the general direction to start my thesis. The basic method to do the analysis and the conception of Business Process Reengineering are all part of my preunderstanding. Nonetheless, my experience in the studied field is rather limited. To find more intermediaries which can help me to know more about the certain field is desirable. During the following weeks I made the library my home, in order to search further information about the theme. Ultimately, I got the preunderstanding to start my research.
Figure 5

Figure 5 Sources for Understanding. (Source: Gummesson, 2000.)

Figure 3 shows the development of understanding. How to get understanding from preunderstanding? Access via personal involvement and own methods of access to experience of others sublime the preunderstanding to understanding.

In scientific theory, reference is made to the hermeneutic circle that can be illustrated by the following statements: “no understanding without preunderstanding” and “an understanding of the parts assumes an understanding of the whole.” (Gummesson, E. 2000, p70)
Preunderstanding can be seen as an input, as stated above. Understanding that contains the insights that one gains by doing an assignment is considered as output. (Gummesson, E. 2000) In order to get more preunderstanding before the start of the research, I asked many Swedish friends to realize their opinions and experiences; what’s more, I reviewed the books I learned to enhance the knowledge. By involving myself with the case pharmacies and using research methods as well as theory, my goal was to assimilate my preunderstanding and turn it into understanding.

2.4 Case Study

A case study is a good way to develop and increase understanding of a complex matter. It can add more experience and opinions to the knowledge that was already gained in previous research. Researcher Robert K. Yin defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context.

Case study is an approach to sublime preunderstanding to understanding. Both the author and reader can get deep understanding via the case study. It is a simple way which helps the reader as well as the author to comprehend the theories that are used in the case study. It is practice. Theories stem from practice first, and then can direct practicing.

This introduction to case study research draws upon their work and proposes six steps that should be used:

- Determine and define the research questions
- Select the cases and determine data gathering and analysis techniques
- Prepare to collect the data
- Collect data in the field
- Evaluate and analyze the data
- Prepare the report
How did I select the certain cases in my thesis?

I took several characteristics into consideration: typical, reliable and easy contact.

**Typical:** Both of the pharmacies have to represent the characters of each country. The readers can understand the general situations of the pharmacies in different countries. It is also easy to compare in the research.

**Reliable:** In order to get deep insight into the research, the pharmacies must be the real cases; only in this way can it be a significant research.

**Easy contact:** The pharmacies should be easy to contact, especially the Chinese one. In Sweden, the pharmacy nearby could limit the time and budget problems. In China, find some friends who works in the hospital can help me to get the information of the hospital and do the interview

“…Other agencies include the National Corporation of Swedish Pharmacies (Apoteksbolaget), which purchases and distributes drugs….” *(U.S. Congress 1995, P.225)* I considered Apoteket in Växjö as the Swedish case in my thesis.

I chose one pharmacy in my hometown in China to be the Chinese case. This pharmacy is familiar to me; I have experienced the real process within it, thus it will be easier for me to do the research in this pharmacy. I asked my parents to contact one of their friends for me A, who works in the hospital. In the beginning, I got the information of the hospital from A indirectly via my parents, after a couple of weeks; I established contacts with A via e-mail and then collected all the information from A directly.

According to Yin *(Yin, R. 2003)*, the documentation, archival records, interviews, direct observations, participant observation and physical artifacts can be made use of in the case study. The data used in this study will be included in the next chapter.

### 2.5 Data Collection
The data collection included the literature review, thesis review, interviews and questionnaires. These useful data helped me to do the further research.

2.5.1 Theoretical Data Collection

At the beginning, I just did some simple comparisons of the flows of getting medicine from the pharmacy between two countries. Afterwards, the result represents the weaknesses of Chinese process, it is necessary to optimize the process in China. Business Process Reengineering (BPR) was mentioned in the strategic thinking course last semester, ascribe to I was not responsible for this part during the course; I have to seek for more information about this method and learn how to use it.

CPI, which was recommended by my supervisor, was a new conception to me; I searched a collection of articles to comprehend this concept. Fortunately, it is not so intricate; I mastered it in a short time.

On the whole, the mission for me was to comprehend the concept of BPR. Here, I have to thank one of my classmates who recommended me a good book about BPR, and I benefited a lot from this book. I reviewed various literatures (books and articles) in the University library in Växjö. The database of the University library is not familiar to me; I did not even know how to search at first. The consultant of the library taught me the search method patiently; afterwards the database called Electronic Library Information Navigator (ELIN), the Electronic publishing and Ebrary became the most effective tools for my data collection.

2.5.2 Empirical Data Collection

Interviews, questionnaire and data from the Internet composed the empirical data.

*Interviews:*

Interviews are the most common way to gather data, and it is also good and efficient.

The in-depth information of the research domain can be represented by the interview. It is often described as a qualitative research method. The quantitative research
methods collect a small quantity of information from many subjects; conversely, interviews collect dozens of information from a dab of subjects. The interview can be considered as a “holistic” research method, as every tiny bit of information contributes to the comprehensive picture with regard to what the interviewee wants to say.

There are two kinds of interviews, structured and unstructured. Structured interview is doing the interview by following a list of questions. The interviewer must be objective and can not influence the interviewee’s opinion. Unstructured interview is an unbending conversation between the interviewer and the interviewee, the style is free-flowing rather than rigid. The interviewer adjusts the questions according to how the interviewee is responding.

I considered my interview as the unstructured interview, this style requires more interview skill, it is a complex but fascinating process. I may ask the same small amount of questions as in the structured interview, in contrast, it is a free-wheeling one.

The follow-up questions were asked via face-to-face interview instead of e-mail interview in Sweden. To send an e-mail in advance to ask for permission to do the interview is essential and polite. With the help of my supervisor Linda, I got the contact way of one staff in Apoteket whose name is Carin Svensson, and I sent her an email attached with my interview questions, unfortunately, she did not reply. After one week, the mail box clued on me that she had deleted my mail already. In a word, the first interview failed.

The second Apotek I visited was located in front of a gas station beside Växjö University, it is included in a care center and consequently, all the staffs there are busy. I asked them whether I could do a short interview scrupulously; Carin Torså accepted my request after she had confirmed the interview questions were brief. However several minutes later the busy work forced her back to her station; therefore, I had to end the interview. Carin Torså asked me to leave my questions in the mailbox outside Apoteket and she would answer them. So I left the questions in the mailbox.
The next day, I went to the same Apotek again to collect the answers of the questions. Fortunately, there were fewer patients that day. Carin Torså accepted the interview this time, but only for the brief questions. So, I had to do the interview in more places.

With the help of my supervisor Linda, I got in touch with Carin Svensson in Linköping again. The short interview was made via phone but due to the bad connection Carin Svensson introduced me to another person who works in Växjö, Susanna Malmqmist. I called Susanna and she asked me to visit her three days later. I think it was a nice interview, when I arrived there; she helped me to solve all my questions fervidly. Finally, the interview came to complete.

Compare to the Swedish interview, the interview in China was easier. I interviewed one staff member who works in the pharmacy in China via email and QQ (a kind of chatting tool, the same function as MSN), all the data were collected successfully.

**Questionnaires:**

Questionnaires was invented by Sir Francis Galton, it is composed by a crop of questions in order to collect information from the respondents, there is often standardized answers which make it easy to edit the data, and it is anonymous. Using questionnaires is a cheap way to do the survey, hence it gains the advantages over some other types of surveys. Everything has both sides, questionnaires also have some shortcomings, the standardized questions might frustrate users, what’s more, the time pressure and different moods are like to influence the results of questionnaires.

A questionnaire allows asking both open and closed questions. We have to be aware of the differences between the two types of questionnaire questions. Open questions mean the responder uses their own words to answer, it is unbending. Whereas, the closed questions are just to tick. It offers pre-written response categories, thus it is easy for the responders to finish the questionnaire.

I implemented questionnaires to investigate the patient satisfaction in both countries, the series of questions will represent in Chapter 4.2.1.3. This approach helped me to gather the useful data to do the comparison in patient satisfaction. Due to the requirement for the questionnaire in my thesis is not so high, I chose the closed
questions type, in order to edit the final result easily.

I went to the big hospital in the center of Växjö and handed out the questionnaires to patients. Eight patients did this questionnaire for me. I also sent the questionnaire to eight Chinese students to collect the data of the Chinese part. They had been experienced from the process of getting medicine in pharmacy. After I collected all the answers, I summed them up to a graph in order to do the comparison of customer satisfaction.

*Data came from Internet*

The data came from Internet are the empirical data came from others; I collected these data in order to compare them with the data that I gathered.

2.6 Value of the study

Yin (*Yin, R. 2003*) defined four tests to evaluate the quality of the empirical research, they are: construct validity, internal validity, external validity and reliability.

2.6.1 Construct validity

To construct validity, dealing with multiple sources of evidence and thus establishing chains of proof while collecting data is very important. In this thesis, the theoretical information gathered by comparing it with books, articles and the data came from the Internet, and then contrasted with the empirical data. (Interviews, questionnaire, own observations)

2.6.2 Internal validity

The internal validity is the establishment of a causal relationship, where certain conditions are shown to lead to other conditions. This validity is not included in this research.
2.6.3 External validity

Establishing the domain to which a study’s findings can be generalized is the clou of external validity.

2.6.4 Reliability

Reliability requires the case study can be repeated with the same results if using exactly the same literature, interviewing the same person and asking the same questions. For this purpose, I tried my best to represent the process and the result faithfully.
Chapter 3 Theory

This chapter introduces the main theories used in this thesis. Business Process Reengineering (BPR) and Continuous Process Improvement (CPI) are all mentioned in the report, however, CPI is not that be emphasized as BPR in my study. It is relatively less important in my thesis and used to compare with BPR approach, thus I did not compose it too much in the paper.

3.1 BPR

Business Process Reengineering is conceived as a process management approach which has the greatest and most argumentative effects in recent years.

3.1.1 What is Business Process Reengineering (BPR)?

Definition:
"... 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." By Hammer and Champy (1993)

"encompasses the envisioning of new work strategies, the actual process design activity, and the implementation of the change in all its complex technological, human, and organizational dimensions". By Thomas H. Davenport (1993)

"Business Process Reengineering, although a close relative, seeks radical rather than merely continuous improvement. It escalates the efforts of JIT and TQM to make process orientation a strategic tool and a core competence of the organization. BPR concentrates on core business processes, and uses the specific techniques within the JIT and TQM "toolboxes" as enablers, while broadening the process vision." By Johansson et al. (1993)

We can use one word to summarize the character of BPR---competitiveness, the first driver of the approach. David K. Carr and Henry J. Johansson considered BPR as a
temple, best practices is the groundwork, change and risk management is the floor, besides, the three underprops are process focus, radical change and dramatic improvement. All the elements compose the temple and then support business process reengineering, finally achieve improving the competitiveness. (*David K & Henry J, 1995*)

![Figure 7](image)

Figure 7 The BPR “temple.” (Source: David K. Carr and Henry J. Johansson)

**Process Focus:** According to David K. Carr and Henry J. Johansson, “A process is a set of linked activities that take an input, transform it, and create an output.” (*David K & Henry J, 1995, p9*) The transformation in the process should add value to the input and then create an output which comes from input but more effective. Figure * shows the process travels from the supplier to the customer.
Suppliers 

Input  Transformation  Output  Customers

Figure 8

Figure 8 How processes travel from the supplier to the customer. (Source: David K. Carr and Henry J. Johansson)

BPR focuses on the core business processes, which contact the customers directly, instead of the internal processes.

Radical Change (David K & Henry J, 1995): The goal of BPR is competitiveness and, if possible, marketplace dominance. David K. Carr and Henry J. Johansson gave the definition of radical change, “Radical Change is a characteristic of this objective, an outcome of taking a process view and departing from the old way of doing business through functional departments.” BPR forces people reconsider the organization from the traditional ways of thinking and working, even though, it is not necessary to destroy all the assets, to find a fresh way to leverage the core competencies and significant management investments for the company is the aim of radical change.

Dramatic Improvement (David K & Henry J, 1995): BPR looks forward to achieve the major improvements in performance rather than the core business processes critical for competitive advantage.

3.1.2 IT and Business Process Reengineering

There is no uniform view on the role of IT in BPR. Some claim that IT is the driver for reengineering; IT is an enabler is another standpoint; one of the means of implementation is the last view. Davenport and Short argued for the standpoint on ‘IT is the driver’, but they all accept the other two roles. According to their opinion, the
following two key questions must be asked (Josh & Joe.2005.):

- “How can business processes be transformed using IT (based on a full understanding of the capabilities of IT)?” (Josh & Joe.2005.p182)

The relationship between IT and BPR can be summarized as the below figure. IT is considered within the different stages of identifying, evaluating and implementing ‘radical’ process change. “This enables a reconciliation of the fundamental questions of impact and alignment of IT strategy development with the rationale for ‘reengineering’ initiatives.” (Josh & Joe.2005.p182) The following Table sums up the questions.

<table>
<thead>
<tr>
<th>Capabilities of IT as an enabler of change</th>
<th>Identify need for change in development of business strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT can be used to model/simulate/prototype options for change</td>
<td></td>
</tr>
<tr>
<td>Evaluation of options</td>
<td></td>
</tr>
<tr>
<td>Implementation of chosen options</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 9**

Figure 9 *The role of IT in Business Process Reengineering (source: Josh Ward & Joe Peppard)*
Table 1

Table 1 Reconciling IT and BPR (source: Josh Ward & Joe Peppard)

3.1.3 Process Reengineering Life Cycle (PRLC) approach

For BPR, there are many methodologies. Although the names and steps are all different, they have the identical basic principles. In this thesis, I used Process Reengineering Life Cycle (PRLC) approach which developed by Guha, Kettinger & Teng(1993) to do the analysis. This approach was detailedly introduced in Kai A. Simon’s article:

Process Reengineering Life Cycle (PRLC) approach (Kai A. 1996)

Step 1 Envision new processes
- Secure management support
- Identify reengineering opportunities
- Identify enabling technologies
- Align with corporate strategy

Step 2 Initiating change
- Set up reengineering team
- Outline performance goals

Step 3 Process diagnosis
- Describe existing processes
- Uncover pathologies in existing processes
Step 4 Process redesign
- Develop alternative process scenarios
- Develop new process design
- Design HR architecture
- Select IT platform
- Develop overall blueprint and gather feedback

Step 5 Reconstruction
- Develop/install IT solution
- Establish process changes

Step 6 Process monitoring
- Performance measurement, including time, quality, cost, IT performance
- Link to continuous improvement

Figure 10
Figure 10 PRLC Approach (Source: Kai A. Simon, 1996)
3.1.3.1 Envisioning new processes

BPR is a radically and drastic improvement, the venturous reengineering requires the organization’s top management sustain it completely. In a general way, the started examination focus on how to run the business without any restrictions, it emphasizes how it should be done to attain maximum performance rather than how current work can be improved. Aligning the reengineering effort with the corporate strategies and organizational goals is also included in this stage. In the first stage, the necessary senior management support is secured, the vital processes are identified and enabling information technology is examined. (Kai A. 1996)

Secure senior management support

The chief executive officer (CEO) and the heads of departments in the reengineering effort are required be willing to support reengineering projects and have the knowledge of BPR, they should know the necessity of disregarding existing constraints and abandoning existing procedures and methods. (Kai A. 1996)

Identify reengineering opportunities

The business is composed by a mass of processes; identify those of them being suitable for reengineering efforts is vital. To get a commonly accepted definition of business process is the first task, furthermore, the genuine knowledge to aware the changing needs of customers and processes’ potential for customer value adding is the second requirement. (Kai A. 1996)

Identify enabling technology

Many constrains in information handling have been removed by the high speed of developing of information technology. Even though, using IT is a way of supporting the activities within the business processes to be implemented rather than a self-purpose. If the companies can keep this mind, IT can be used as an instrument to gain in speed, productivity and so on. (Kai A. 1996)

Aligning with corporate strategy

Examining the internal and external strategies related to the reengineering opportunities and enabling technologies are included in this step. Without strategic
3.1.3.2 Initiating change

This stage is about the implementation. The reengineering project enables the reengineering team be combined from the various departments, the reengineering direction is lined out and performance objectives are defined and set in the meantime. (Kai A. 1996)

The reengineering team

The reengineering team is assembled from multiple units within the organization; a comprehensive company project may consist of people from all units, while the undersize projects may involve people from the affected units merely. The team leader who bears the blame for the result is allocated by the top management, after that, the team leader assigns the assignments to the other members in the team. (Kai A. 1996)

In this thesis, the reengineering projects is not an overall company project but a minor project, it is only focus on the core part of the business process.

Performance goals

According to CSC Index Inc, time, cost and number of defects are the three areas that potential benefits can be realized. Nolan, Norton & CO offers four dimensions of performance: Financial success, customer satisfaction, internal processes, organizational learning. (Kai A. 1996)

3.1.3.3 Process diagnosis

After the basis performance goals are achieved, the reengineering is willing to perform an in-depth analysis of the processes to be reengineered. This stage focuses on the further success of the reengineering efforts.

Describing existing processes

Gaining genuine understanding how existing processes work, the span, linkages and
bottlenecks is very important, the factors below are significant in process documentation (Kai A. 1996):

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

**Uncovering pathologies**

The inefficient work-flows and sequences of activities, high costs, insignificant value adding for customers e.t., are all called pathologies of processes, they have the different nature. It is essential to detect and document them. Thus, according to the different nature of pathologies to apply the different quantitative and qualitative methods is required. (Kai A. 1996)

### 3.1.3.4 Process redesign

Time, cost productivity, quality and capital commitment are all as the measure dimensions for redesigning business processes. The single dimensional approach would result in sub-optimization of processes, thus a consideration of multiple dimensions is required. In addition, some performance measures are simultaneous; the definition of preferences is also required. (Kai A. 1996)

**Alternative process designs**

Multiple design alternative are prepared for every process, in order to identify and determine the most suitable process structure and enabling technologies, they should do the investigation of alternative designs and the possible implementations. (Kai A. 1996)

**New process design**

“Why” and “How”, these two words should be considered all the time. For the purpose of achieving the success, the following critical aspects have to be disposed (Kai A. 1996):

- 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**

Human resources architecture design is one of the most important tasks in the reengineering project, the factors below are basically for restructuring of the human resources architecture successfully (*Kai A. 1996*):
- 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**

Presenting immediate response about the improvement and acceptance of the reengineering effort to the reengineering is the main function of prototyping. The organization can use prototyping to do the simulating and estimating reengineering potentials within it. It is used before the final process design is determined, in order to enable the reengineering team and management to do the adjustments. (*Kai A. 1996*)

**Selection of IT platform**

There are several conditions for choosing the IT platform. First and foremost, the IT platform should contain the capability of supporting the new designed processes, besides; the flexibility to the changing processes and new technologies is also required. The actual and future information requirements should be the main forces to the selection of the information system architecture. (*Kai A. 1996*)

**3.1.3.5 Reconstruction**

This part describes the performing change and the capability of adopting change
within the organization. The implementing change failure may bring on the costly project failure and potential future inconfidence of employees.

**Installing IT**

One of the steps within the reconstruction which can not be ignored is IT, the enabling technology for implementing change and supporting processes. The existent systems may be changed or totally replaced due to the radical change and the adaptability of the existent information technology. (*Kai A. 1996*)

**Reorganizing activities**

Making the organizational structure be seasoned with the new determined processes is a vital mission.

### 3.1.3.6 Process monitoring

In order to ensure the implementation and contribution to quality improvement, the determined and implemented processes have to be monitored in an ongoing process. The repeat process in which the new processes are used as input to stage 3 (diagnosis) of the methodology will make this possible. The reengineering is a continuous process of lasting improvement. (*Kai A. 1996*)

**Performance measurement**

The new processes’ implementation has to be measured and compared to the processes being substituted. The following factors show the performance of measuring (*Kai A. 1996*):

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

**Links to quality improvement**

Quality improvement is the main difference in focus between reengineering and other approaches like Total Quality Management (TQM), reengineering focuses on drastic changes and improvement, TQM is concerned with continuous improvement. Reengineering should be linked with quality programs. (*Kai A. 1996*)
3.2 CPI

3.2.1 What is Continuous Process Improvement (CPI)?

*Definition:*

The Continuous Process Improvement is “An ongoing effort to incrementally improve how products and services are provided and internal operations are conducted.” ([http://www.gao.gov/special.pubs/bprag/bprgloss.htm#sectC. 2007-4-29](http://www.gao.gov/special.pubs/bprag/bprgloss.htm#sectC. 2007-4-29))

Never stop seeking for quality improvement is the permanent issue. Continuous Process Improvement (CPI) is a kind of approach which implementing small-steps improvements to achieve detecting and eliminating the prime causes of problems. In contrast to Business Process Reengineering (BPR), it is not a drastic change. CPI focuses on how we do our work better rather than blaming people for problems or failures ([http://www.nwlink.com/%7Edonclark/perform/process.html. 2007-4-29](http://www.nwlink.com/%7Edonclark/perform/process.html. 2007-4-29))

When engage in process improvement, it is needful to look for what causes the result and then use this knowledge to the following purposes ([http://www.nwlink.com/%7Edonclark/perform/process.html. 2007-4-29](http://www.nwlink.com/%7Edonclark/perform/process.html. 2007-4-29)):
- Reduce variation.
- Remove activities that have no value to the organization.
- Improve customer satisfaction.

3.2.2 Value-added Flow Analysis

(*Lisa A. & Barbara C, 2005*)

According to the article which wrote by Lisa A. Palmer and Barbara C. Ingrassia, I adopted “Value-added Flow Analysis,” approach for CPI in my thesis.

Value-added Flow Analysis has three parts:
- Imagine yourself as the actual thing in process
- Identify steps in the process and then time each one
- Determine if the steps add value.
What is Value?

- It is important and good for the customer, what’s more, the customer concern it and appreciate it.
- The thing is physically changed by the step in process.
- The step is done right the first time.

### 3.3 The differences between BPR and CPI

The relationship between Business Process Reengineering (BPR) and Continuous Process Improvement (CPI) has been debated for a long time. These two approaches are all aim at improving the process but focus on dissimilar part. Business Process Reengineering focuses on process relations, whereas, Continuous Process Improvement emphasizes mildly incremental improvements, generally speaking, these incremental improvements mostly concern on the individual parts of a process or system.

BPR is the reengineering on the blank sheet of paper to reconstruct a new process to the business. CPI is the small improvement on the existing process.

The BPR goal is to reach a breakthrough gain and achieve dramatic process performance; it is not a continuous improvement and BPR goals greater than 50% improvement. *(Mihail, 2004)* The following figure shows the drastic improvement of BPR.
The following table presents the differences between BPR and CPI; it is created by an article online: [http://zeus.bke.hu/oktatas/cems/perspectives/ProcessCatalysts.pdf](http://zeus.bke.hu/oktatas/cems/perspectives/ProcessCatalysts.pdf).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Business Process Reengineering</th>
<th>Continuous Process Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree of change</strong></td>
<td>Radical</td>
<td>Incremental</td>
</tr>
<tr>
<td><strong>Starting point</strong></td>
<td>Empty page</td>
<td>Present process</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>Occasional</td>
<td>Occasional/continuous</td>
</tr>
<tr>
<td><strong>Time needed</strong></td>
<td>Long</td>
<td>Short</td>
</tr>
<tr>
<td><strong>Direction</strong></td>
<td>Top-down</td>
<td>Bottom-up</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>Wide, cross-functional</td>
<td>Primary intra-functional</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Role of IT</strong></td>
<td>Cornerstone</td>
<td>Incidental</td>
</tr>
</tbody>
</table>
Table 2

Table 2 **Differing characteristics of business process reengineering and continuous process improvement** (based on Davenport, 1993, p. 11; Dobak, 1999; Turban McLean—Wetherbe, 1996, p. 133.)

### 3.4 The relationship between BPR and CPI

We cannot say which is the better one between BPR and CPI approaches. It is better if BPR is combined with CPI. On the whole, CPI is the process improvement after implemented BPR to achieve the reengineering in order to maintain competitiveness.

#### Graph 1

*Continuous process improvement and business process reengineering as symbiotic actions* (based on Turban—McLean—Wetherbe, 1996, P 127)

### 3.4 Customer Satisfaction

For hospitals, customers are patients; in addition, customer satisfaction equals patient satisfaction. “Patient satisfaction surveys are increasingly used by hospitals to monitor quality of care and identify domains for quality improvement initiatives.” *(THOMAS V, 2003, P2)* I use this element to judge the current process in the hospital; satisfaction questionnaire is the tool for me to do the survey.
Chapter 4   Case study

The outpatient pharmacies mentioned in this report point to the pharmacies which relevant to the hospitals, they are different from the private pharmacies. This Chapter consists of Company Presentation, implementing BPR in Xiantao Hospital in China and applying CPI in Apoteket in Sweden. The contents of the interview are the basis for me to do the comparison, in another words, the following data mostly comes from the interview.

4.1 Company Presentation

The pharmacies which I chose can represent the general situation of each country.

In Sweden: Apoteket shop in Växjö.

![Figure 12](image)

Figure 12 the ideograph of Apoteket

Apoteket shop, the one and only agency that provides the medicine to the patients, is the only and best choice for my study. It is as the representative for the condition of getting medicine from the pharmacy in Sweden. There are nearly 900 chain pharmacies all over the country; I chose the one which is sited at the center of Växjö city, because this is the one nearest to my university, and it is convenient for me to do the interview for the investigation.

“Apoteket has an exclusive right to provide prescription drugs to Swedish citizens wholly-owned by the Swedish state. Apoteket is also responsible for the purchase and supply of drugs to the health services. These healthcare principles have the option of assuming responsibility for this under their own management, and all have chosen Apoteket as their service provider. With more than 12,800 employees and approximately 900 pharmacies, Apoteket's aim is to be responsible for the safe and reliable use of
In China: Xiantao Hospital.

Figure 13

Figure 13 the ideograph of Xiantao Hospital

Xiantao Hospital is a medium-sized hospital in my hometown---Xiantao city in Hubei province in China. It is not such an advanced hospital; however, it can represent the universal circumstances of the pharmacy in the hospital in China. Although there are many superior hospitals in China, they can not show the weakness of general situation of the pharmacy in the hospital.

4.2 Analysis

All the analysis base on the comparison between Swedish process and Chinese process; in this Chapter I will implement PRLC approach which belongs to BPR method to analyze the current processes. The emphasis of this Chapter is on implementing BPR to optimize the Chinese process. In addition, the shortcoming of Swedish process will also be found in Chapter 4.2.1.3 Process diagnosis, and I will use CPI to achieve the improvement of Swedish process in Chapter 4.2.2.

4.2.1 Apply PRLC to optimize the Chinese process

The motivation of reengineering in Xiantao hospital is to improve the competitiveness of the hospital, that’s the first driver of BPR. I will implement PRLC approach to do the reengineering in Xiantao hospital. Chapter 4.2.1.3 Process diagnosis and 4.2.1.4 Process redesign will be the emphases in my study.
4.2.1.1 Envisioning new processes

This chapter focuses on the managing level. Secure senior management support, identify reengineering opportunities, identify enabling technology, aligning with corporate strategy are all the contents involved in this chapter. It requires the strong BPR capability of the manager in the organization. This part is not the emphasis in my thesis.

4.2.1.2 Initiating Change

Determining the performance goals for reengineering is basic. The goals for Chinese process reengineering are: Improve patient satisfaction, enhance the competition of the pharmacy within the hospital, and resolve the queuing problem.

4.2.1.3 Process diagnosis

(1) Describing existing processes

The existing processes are described to do the comparison; the weakness will be easy emerged from the comparison. The aspects compared below are the elements that can be changed by BPR in this case study. Although there exist some other different aspects can be compared, they can not be changed by BPR, for instance, the price of medicine. Multiple elements result in the high price of medicine in China, but they relate to the reform of the medical system of the country, thus it is insignificant to compare these factors here, because they won’t be changed by the process improvement methods used in this paper. Though the owner situation which can not be changed is compared in this section, it is as a brief introduction for the background of pharmacy in each country.

The owner situation

This part has already been mentioned in 1.1.1 The situation of pharmacy in Sweden and 1.1.2 The situation of pharmacy in China

The form of the prescription

Sweden
A great mass of the prescriptions are the electronic prescriptions, they are saved in the database in the computer and be transformed via internet. “Currently 42% of all prescriptions in Sweden are transferred from the doctor to the pharmacy electronically via Sjunet.” (TanJent, 2006, P3) “In Sweden, the prescriptions are transferred from the doctor to Apoteket via Sjunet, the Swedish ICT network for healthcare, or by using web based prescribing.” (TanJent, 2006, P3) “ePrescriptions can either be sent to a specific pharmacy or to the national mailbox. From this mailbox, all 900 pharmacies in Sweden are able to pick up the ePrescription.” (TanJent, 2006, P5) The personal number is the identification to get the electronic prescription from the system. Sometimes, the doctor may use the printed yellow form to write out the prescription. Patients can go to any pharmacy they want; that is to say, both of the forms exist in the current process.

China
In China, most of the prescriptions are written on paper, the patients should hold the prescription to the outpatient pharmacy in the hospital to get their medicine. This circumstance ascribes to the low level of IT within the hospital in China.

The included departments

Sweden
Most of the Apoteket stores have two units: one for selling the medicine on prescription, and one for selling the medicine without prescription. They are in one store.

China
From prescription to getting the medicine, there are three departments be included: Prescription Pricing, cashier and pharmacy.

Prescription Pricing
This department fixes the price of the medicine on the prescription for the patients.

Casher
It is the finance center of the whole hospital; all the payments are completed here, not excepting the one in the pharmacy.
The pharmacy within the hospital is prepared for the prescribed medication. Although it contains the non prescribed medicine, the patient also needs to hold the prescription to get them. That is to say, if the patient wants to get the non prescription medicine from this pharmacy, he has to ask the doctor to write out a prescription for him, and then holds the prescription to get the medicine he wants. Most of the time, patients don’t do this, because this way is discommodious. To go to a private pharmacy outside that provides the self-medication often be the first choice.

The layout of the pharmacy

Sweden
In Apoteket, the selling type for the non prescription medicine is self-medication type; the patients can get whatever they want by themselves in this area. Relatively, the type for the prescription medicine is not that open as the one for non prescription medicine, patients can not get into this area; however, it is still open-- there is only one table between the patients and the staff.

China
It is a close type for the pharmacy within the hospital in China, the patients and the
dispensers can only communicate through a small window. The windows of the pharmacy are mostly like the one in the following pictures:

![Image 1](image1.jpg)

![Image 2](image2.jpg)

*Figure 15*

*Figure 15 The windows of the pharmacy department*

**The task for the staff in pharmacy**

**Sweden**

There are three kinds of staffs in pharmacy: Apotekare, receptarier and Apoteks technician. Apotekare and receptarier have the capability to be responsible for checking prescription for patients. However, the level of Apoteks technician is lower
than Apotekare and receptarier’s, he can only answer for non prescription parts. If the patient only needs non prescription medicine and he chooses the medicine himself, Apoteks technician is responsible for instructing and charging. For Apotekare and receptarier, the tasks are more complicated. Checking prescription, collecting medicine, instructing medicine and charging are all the tasks for them. In addition, if the doctor prescribed a wrong prescription for patient and the staff in Apoteket did not find the mistake, both of them will be responsible for the accident.

**China**

The staff in the outpatient pharmacy has the only and monotonous work: packaging medicine for the patients without checking prescription. They only need to check whether the prescription has already gotten such sign which indicates the patient has paid the medicine on the prescription, and then collect the medicine for the patient.

**The process of getting medicine**

**Sweden**

According to the contents of the interview, add on the information came from the Internet, I integrate the flow as follows:
Figure 16

Figure 16 The flow of getting medicine from the pharmacy in Sweden (source: own creation)

In Sweden, the patient may go to the local surgery when he is ill, most of the time; the doctor types out an electronic prescription and sends it to Apoteket directly, sometimes a patient who is used to paper documents may ask the doctor to write a paper prescription. Then, the patient goes to Apoteket to get his medicine. The patient notifies the staff in Apoteket that he wants to get the medicine on prescription after he arrived there. If the prescription is an electronic one, the dispenser who works in the Apoteket will input the personal number of this patient in the computer to call up the prescription for this patient, if the prescription is a paper document, the patient only need to give the prescription to the dispenser in Apoteket. After receiving the prescription the dispenser will check the prescription whether it is reasonable, in addition, check whether the different medicine on the prescription can be taken at the same time is also necessary. The medicine will be packaged for the patient if all things
are right, otherwise, the dispenser will contact the doctor to correct the prescription for the patient. Sometimes the patient needs to take a queue ticket and wait for his turn to get the medicine.

China

![Flowchart of getting medicine from the pharmacy in China](source: own creation)

**Figure 17** The flow of getting medicine from the pharmacy in China (source: own creation)

In China, the process includes four steps:
- Visit the doctor and be examined by the doctor and then get the prescription.
- Hold the prescription paper and queue for fixing the price of the medicine on prescription at Prescription Pricing
- Queue to pay the money at the cashier.
Queue to get the medicine at the pharmacy.

**Customer Satisfaction**

This part is summed up from the questionnaire. It is a small questionnaire; however, it can present the general situation of satisfaction adequately in each country. Eight Swedish patients and eight Chinese patients did this questionnaire for me. The questions are as follows:

**Questionnaire:**

*(The meaning of number: 5 excellent  4 good  3 common  2 bad  1 terrible)*

1. Do you like the current form of prescription?  
   5  4  3  2  1

2. Is the layout of pharmacy friendly?  
   5  4  3  2  1

3. Do you think the communication between patients and dispensers is well?  
   5  4  3  2  1

4. How well do you think the staff in the pharmacy cooperated with each other?  
   5  4  3  2  1

5. How do you feel the queuing problem within the process of getting pharmacy?  
   5  4  3  2  1

6. Do you like the current process of getting medicine from pharmacy within the hospital?  
   5  4  3  2  1

The result of the questionnaire will be presented in the next section--(2) *Uncovering pathologies*.

**(2) Uncovering pathologies**

Based on Chapter *Describing existing processes*, I do the analysis to find out the weaknesses of both countries, especially for Xiantao hospital. Actually, I want to regard the Swedish process as a model, and then chase down the weaknesses of the Chinese process.
The owner situation
The owner situation results in the high price of medicine in the pharmacy within the hospital in China. There is an argument about whether the outpatient pharmacy should be separate from the hospital, in my opinion, it relates to the reform of the medical system of the country and is hard to realize. Thus, it won’t be discussed in this report. The aim of this report is to optimize the current flow in the hospital; maybe it will be a good transition to achieve the separation for the reform.

The form of the prescription
Compared with the Swedish form, the Chinese one is old and non-technical. In China, the information system is not as clear as a bell, that is to say the information system has not gain ground of the hospital yet. IT is the key factor of improvement for the organization in the present ear, accordingly, for the Chinese part; to enhance the IT implementation in the hospital is the necessary and essential work.

The weakness of the Chinese prescription form:
- The paper documents are not easy to save.
- Sometimes, the handwriting is hard to make out.
- People can not share one document in the different place at the same time.
- The transformation of the prescription is not instant.
- It is not easy for the doctor to do the comparison between the various prescriptions.

The included departments
This part will be discussed in ‘The process of getting medicine’ within this Chapter.

The layout of the pharmacy
Compared to the layout in Sweden, I think the one in China is unfriendly to the patients; it is a closed one, consequently, the following weaknesses are emerged:
- The patients may feel uncomfortable when they face the closed windows in the hospital.
- The glass of the windows detach the dispensers and the patients, they can only communicate well from the limited place.
- The bad communication result in the dispenser’s job limited in handing out the
medicine, but not providing the Pharmaceutical explanation.

- The high Counters result in the children and the runty people can not see the dispensers inside.

**The task for the staff in pharmacy**
The Chinese staff involved in the process of getting medicine has a single and clear task, it is called division of labor which benefits for the professional work, it is a good phenomena. Nevertheless, they ignored cooperation among the staffs, which combines each professional work and makes the whole more efficient. In Sweden, the dispenser is also in charge of receiving money, that is to say, one staff in the pharmacy will be responsible for one patient. In this way, patients do not need to move in the multiple departments.

**The process of getting medicine**
The process of getting medicine in China is superfluous. If the patient wants to collect his medicine, he has to move in three departments, it attributes to the division of labor in the hospital. Division of labor can make the staff’s job easier and more efficient; nevertheless, cooperation is the pivotal key for high efficient work. Compared to the process in Sweden, the Chinese process contains less cooperation among the workers. The low lever of IT implementation can not shift the responsibility.

Superfluous steps for getting medicine can not avoid queuing. In China, patients have to queue up for three times when they are in the process of getting medicine. The weaknesses of queuing in hospital are as below:

- The patients should queue up for three times to get the medicine; it will waste a lot of time, and it is low efficient.
- The re-queue is bad for the old people and the sick patients.
- The long time of queuing will increase the possibility of Cross-infection
- Reduplicative and long time queuing may force the conflict between patients and staff in the hospital.

Queuing not only exists in Chinese process but also in Swedish process, both of the countries have to ameliorate this shortcoming.
It seems like there is no advantage in Chinese style process, actually, there is.
In Sweden, patients are unable to know the price of medicine on the prescription before they go to Apoteket, however, they don’t need to know it, since the staff will change expensive medicine to equivalent chapter one for patients, that owns to the complete system of publicly funded protection for high costs in Sweden. The behavior of the staff can save money for both patients and society.

The Chinese system of publicly funded protection for high costs is defective, only 30% of the citizens are protected, thus sometimes some patients can not afford or are unwilling to pay the expensive medicine. Consequently, knowing the price of medicine on the prescription before paying for it is significant to the Chinese patients. This problem has been resolved by the Prescription Pricing department; patients can know the price of medicine on the prescription in advance and then decide whether to pay for it in the hospital.

Maybe the function of Prescription Pricing department is an advantage within Chinese style process.

**Customer Satisfaction**

From the conclusion of the questionnaire, I created a graph to contrast the customer satisfaction between the two countries; it is obvious that customer satisfaction in China is really low; by contrast, Swedish process is more welcome:
Improving the current process of getting medicine in the pharmacy in China is really a pressing need.

4.2.1.4 Process redesign

From the analysis of comparison, it is obvious that the Chinese process should be changed for the sake of development for hospital as well as the benefit for patients. Taking advantage of the Swedish process, I will apply BPR to optimize the Chinese process.

(1) Alternative process designs

In order to determine the most appropriate process structure and enabling technologies, alternative process designs should be done in the abstract, it will be discussed in Chapter 5 Discussion.

(2) New process design

The existing process and common sense may affect the redesign tend to the old pattern. Just abandon the current process of getting medicine and regard it as a blank
Several methods can carry through the redesign; I chose ESIA method to design. ESIA means eliminate, simplify, integrate and automate. The new design must eliminate pathologies of the old process, simplify the remainder process and work, integrate the simplified task, and automate information and process to satisfy the patients.

<table>
<thead>
<tr>
<th>Eliminate</th>
<th>Simplify</th>
<th>Integrate</th>
<th>Automate</th>
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<tr>
<td>Closed layout of pharmacy</td>
<td>Process</td>
<td>Three departments</td>
<td>Prescription transmission</td>
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<tr>
<td>Old paper form of prescription</td>
<td>Communication</td>
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<td>Three departments involved</td>
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<tr>
<td>Re-queue</td>
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</table>

**Table 3**

Table 3 ESIA analysis *(Source: own creation)*

**Eliminate:**
In the first place, the new process has to avoid the old layout of pharmacy, eliminate unfriendly pattern for the patients. It is also good for enhancing the competition of pharmacy within the hospital. Besides, old paper form of prescription should also be eliminated; the implementation of IT will be the best way to deal with this problem. What’s more, the reengineering must eliminate the multiple departments involved in the process of getting medicine. Finally, it has to eliminate the re-queue phenomena.

**Simplify:**
After eliminated the insignificant ingredients within the process, the remainder process should be simplified. The process shouldn’t be a complex one but the simplest one for patients. In addition, the communication between patients and staff also need to be simplified.

**Integrate:**
In my design, I want to integrate Prescription and Prescription Pricing, and then integrate Casher and Pharmacy; it will be more efficient if they are a whole. In the first place, I want the advantage of the Chinese process of getting medicine to remain ---Patients can know the price of medicine on the prescription before they collect the medicine. It is a special solution for Chinese situation. Patients can measure whether they are willing to collect medicine here. Furthermore, the staffs have to cooperate, in another word; they should implement the team work, so the staffs have to be integrated.

Automate:
The most important element within BPR is to implement IT tool. Automating the prescription transmission is essential; moreover, applying IT to achieve information sharing is also the part and parcel.

ESIA method is a step by step approach, depending on this approach, I design a new process. The contradistinctive processes are showed in the following picture:
Figure 18
Figure 18 The process before and after redesign (source: own creation)

Presentation of the new process after redesign

The form of the prescription
After implement IT tool, the prescription turns to the electronic one. Doctors use a computer to make the prescription with the price of medicine. The prescription will be printed out for the patient and be sent to the pharmacy by intranet. In this way, the prescription can be sent to the pharmacy directly, and at the same time, patients can know the price of medicine on the prescription before they collect the medicine.

The included departments
There is only one department in the process, the same style as Swedish pharmacy. In
this unit, two areas will be included. The first part is for the prescription medicine; patients won’t be allowed to enter this area, the dispensers will collect the medicine for patients. The second area is for the non prescription medicine, patients can choose the medicine by themselves.

**The layout of the pharmacy**

The layout of the new pharmacy is the same as the Swedish one, it is an open pharmacy without windows, the communication between patients and staffs in the pharmacy will be highly close and efficient.

**The task for the staff in pharmacy**

One dispenser is responsible for one patient. First, the dispenser will chase down the prescription from the computer according to the ID of the patient. The second step is to check the prescription and ensure there is no mistake on the prescription. To collect the medicine is the third task, in another word; the dispenser has to pack the medicine on prescription for the patient. Ascribing to the layout of old process in China, dispensers and patients could not communicate well, however, without the windows between them, dispensers are liable to explain the functions of multiple medicines. The dispenser also needs to charge the patient for medicine, it is the final task.

**The process of getting medicine**

Only two steps are contained in this new process. To start with, the patient is examined by a doctor and then gets the prescription which includes the price of medicine, he don’t need to hold this prescription to collect the medicine, the function of the prescription for the patient is just showing the price of medicine on the prescription. After the patient knows the price of the medicine, he will measure whether he can afford or is willing to pay these medicines, if the answer is not; he may give up to collect his medicine in this hospital.

The second step is to collect the medicine. As mentioned before, a doctor will send the prescription to the pharmacy directly, if a patient determines to collect the medicine within the hospital, he will show the ID card, which identifies the different citizens, to the dispensers in the pharmacy. According to the number on the ID card, the dispenser is able to find out the right prescription for this patient, and then check the
prescription for the patient. Explaining the instruction of medicine for patients is an added link in the new process. After all the things have done, patients can pay for the medicine in the pharmacy.

There still exist a weakness in the new process, which also exists in the current Swedish process; it is about the problem of queuing. This problem will be solved in Chapter 4.4.2 ‘Implement CPI to improve the Swedish process.’ The Chinese process will also improve this part in the same way.

(3) Designing the human resources architecture
This step is almost relevant to the staffs in pharmacy. After redefining the task for the staffs, the management techniques should also be changed. Emphasizing the importance of team work is essential. The ingredients involved in the process of getting medicine should be assessed as an integrator.

(4) Prototyping
Prototyping is used for assessing the effort of reengineering; it is also used for adjusting. Before implementing the design into the real process, prototyping is a good way to evaluate the impact of final result in advance.

(5) Selection of IT platform
Before selecting IT platform, it is important to comprehend the relationship between Supply and Demand of e-health.

E-health used as a supporter to support the Supply part in meeting the Demand of healthcare. With the developing of medical science and technology and expectations for future opportunities, the demand for high quality is a foregone conclusion. (TanJent, 2006)

The interaction of supply and demand can be presented as follows:
Figure 19
Figure 19 Supply and demand in modern healthcare system (Source: TanJent & Kadris & Jagiellonian & ESYS, 2006.)
The ten e-health applications focus on different parts of healthcare
(Source: TanJent & Kadris & Jagiellonian & ESYS, 2006.)

From this picture, we can easily recognize that medication applied eRecept platform. ERecept points to the electronic prescription, which also called e-prescribing. In China, there is only one pharmacy within the hospital, thus using ICT network to transfer e-prescriptions. It equals to the e-prescriptions be sent to a specific pharmacy in Sweden.

4.2.1.5 Reconstruction

(1) Installing IT
After selected IT, the IT tool has to be installed. It is an enabling technology for implementing change and supporting processes.

(2) Reorganizing activities
This part focuses on the adaptation. If aiming at adapting the new process, a mass of problems have to be resolved. These problems will be discussed in Chapter 4.2.2.
4.2.1.6 Process monitoring

**Performance measurement**
Evaluating is an essential work after the implementation. The process has to be measured by cycle times, customer value adding, quality, IT performance, employees and so on. This behavior can keep the advantage of reengineering.

4.2.2 The challenges of implementing the new process

Although ‘copy’ an existing process from Sweden is easy and feasible, the challenge of implementing the new process can not be ignored. First and foremost, the process of changing from old style to advanced style must suffer from problems of adaptation. What’s more, there are many difficulties to apply the other country’s process, such as the different culture and situation. In this chapter, I will take the experience of the Swedish process changing; the following questions guided me to do the analysis for challenges: How did Swedish process change from old style? What were the problems in the changing journey? How did they adapt the new process? I will discuss the challenges from culture, doctor, patient and technique.

4.2.2.1 Culture

Due to the disparate backgrounds and environments, the culture of each country is different, especially between eastern and western. Culture differences are embodied in perspective, custom, logic and so on. For instance in china, the concept of team work is not so consuming, the people are used to individual work. Thus time is needed time to let people get accustomed to team work.

4.2.2.2 Doctor

The biggest challenge is changing the prescription’s form from paper document to electronic one. Maybe for the youngster, it is quite easy to accept new things, but for old doctors, to learn a new system and to implement computers for prescribing are really hard. In Sweden, they spent nearly five years to let doctors be used to utilize computer to type out the prescription, afterwards, they spent almost five years again to make doctors be conditioned to sent the electronic prescription to pharmacy directly. Therefore, the doctors in China need time to adapt to the new process.
4.2.2.3 Patient

Similarly, Patients also need time to adapt to the new form of prescription, especially elder patients. Perhaps most of the senior patients want to hold the real prescription rather than the electronic one. The coexistence of two forms of prescription will be impactful in the beginning of changing.

4.2.2.4 Technique

Implementing technique from the low level of IT within the Chinese pharmacy is a hard assignment. If China wants to be on par with Sweden, it has to resolve the problems of connection among multiple systems. In Sweden, this problem is easy to deal with, because there is only one big Apoteket organization, all the Apotekets in Sweden are as the internal parts of the whole system. In contrast, although it is easy to solve the problem of system connection in one hospital, it is extremely difficult to connect the multiple systems among different hospitals’ pharmacy and private pharmacies.

4.2.3 Implement CPI to improve the Swedish process

CPI is a small-steps improvement, it aims at removing activities that have no value to the organization and improve customer satisfaction. From the analysis of Swedish process, it is obvious that the queuing problem also exists in Sweden.

In Sweden, patients have to queue up to collect medicine in Apoteket, to reduce the queuing time is the purpose of implementing CPI in Swedish process.

I recommend applying SMS to resolve the queuing problem. The doctor is liable to ask the patient two questions after he prescribed the prescription:
1. Do you want to be notified the exact time to get your medicine?
2. Which pharmacy would you like to go?

If the patient prefers to be notified the exact time to take his packed medicine, he should tell the doctor which pharmacy he would like to go to, whereafter, the doctor will ask the patient’s phone number and then sent the prescription attached the patient’s requirement and phone number to the pharmacy which the patient will go.
The pharmacy which has received that kind of prescription will collect and pack the medicine for the patient, after all the things have done, the pharmacy will send a SMS to the patient: “Your medicine is ready you can come here to collect them whenever you want. Our opening time is: X: XX AM---X: XX PM” After the patient received this SMS, he can go to the pharmacy to get his medicine whenever he wants. Maybe there still exists a queue for getting the packed medicine, but that queue will be a fast and efficient one.

Another way to avoid the queuing
Pharmacy can offer a special website for mailing the medicine to patients. The patient can find out his personal prescription on this website according to his personal number. If the patient wants the pharmacy to mail the medicine to him, he may fill in his address and contact way in a table on this website, and then pay for the medicine online. The pharmacy will mail the medicine to the patient after received the payment.

4.3 Reflection

Why China not shall use CPI before BPR?
CPI is a small-steps improvement, it aims at removing activities that have no value to the organization and improve customer satisfaction, and it is for the organization that has a nicer foundation, if the hospital implements CPI without a nicer foundation, it can not gain the good result. Actually, some advanced hospitals that have the nicer foundation in China have implemented CPI instead of BPR to improve the patient satisfaction and enhance the efficiency within the hospitals. Since these hospitals are the superior hospitals in China however, they can not represent the universal circumstances of the pharmacy in the hospital; in addition, they can not show the weakness of general situation of the pharmacy in the hospital. For the universal circumstances in China, BPR is a better choice in my opinion. So, I did not discuss implementing CPI before BPR in Chinese hospitals in this thesis.

How about change owner situation in Sweden?
To be frank with you, I have not considered about this question before at all, but some of my classmates and my teachers are interested in this issue, so I will try to present some of my opinions here. Sweden is a welfare state, pharmacy is owned by Swedish
state, so it can be managed expediently, in addition, the citizen could benefit from the welfare easier.

Free competition is the outcome of the developing world, the free competition in the market can force the developing of the organizations as well as the service for the customers. Changing owner situation of the pharmacy in Sweden can be considered as an innovation, this innovation requires an impelling managing system. However, this area comes down to the economic domain; I think I have to consult some economist to discuss this question.
Chapter 5 Discussion

In Chapter 4, I regard the Swedish process of getting medicine as a model to reengineer the Chinese process. Although I have recommended China to ‘copy’ the Swedish process, there still exist some other possibilities. These possibilities will be presented in this chapter.

5.1 Remain the advantage of Chinese style

The prescription with the price of medicine was mentioned in Chapter 4.2.1.4 Process redesign: *The process of getting medicine*. I recommended to print out the price of medicine on the prescription, in this way, patients can know the price of medicine on prescription before go to collect the medicine. This is the advantage of Chinese style, here; I want to suggest another way to remain this advantage.

Different medicines with the same function can vary in price according to the different manufacturers; doctors can show the different prices of the same medicine to the patient with a computer, therefore, the patient can choose an expensive one or a cheap one as he likes. This behavior can improve the competition of the pharmacy within the hospital versus the private pharmacies.

5.2 Setting up a pharmacy club

The phenomenon of multiple places as the choice to get medicine on the prescription is the trait of Chinese healthcare system, the great mass of medicine shops can sell most of the prescription medicine. Thus patients can compare the different prices of the medicine to decide which place they would like to go to. Despite do the comparison of the prices is benefit for patients, it is still inconvenient. Due to the unacquainted prices of medicine in each pharmacy, patients have to move in multiple pharmacies to compare the prices. At this point, seldom patients would like to do this kind of comparison, they get their medicine in the pharmacy within the hospital directly or in the pharmacy which is the cheapest one in their mind instead. It is the unfavorable condition for patients.
I suggest setting up a pharmacy club for patients, which can provide the price comparison online. To achieve this idea, these pharmacies have to implement IT tool. First and foremost, the prices of medicine in different pharmacies can be updated on the website, and accordingly, patients can compare the prices according to the medicine’s name online. After selected the pharmacy they prefer, they can go to this pharmacy to collect their medicine with the prescription, or pay for the selected medicine online, and ask for mailing.

In my opinion, this idea creates advantages for both patient and pharmacy, but it is hard to implement, the unsoundness of the information system is the leading course. Thus, developing the implementation of IT in China is the first imperative.
Chapter 6 Conclusion

To answer the first research question of this thesis’ what is the difference of the process in getting medicine from the pharmacy between Sweden and China?’ it can be said that there are really a mass of differences, I just compared from owner station, the form of prescription, the included departments, the layout of the pharmacy, the task for the staff in pharmacy and the process of getting medicine in pharmacy. These aspects represent the weaknesses of Chinese process that forced me to turn to the second research question’ How to optimize the Chinese process by taking advantages of the Swedish process?’ I considered to ‘copy’ Swedish process in China, for this purpose, reengineering was essential. BPR is a process improving approach which can do the reengineering, although it has its limitation, it is still efficient to be applied to do the optimization. Thus BPR helped me to solve the second questions. The third question is ‘How to improve the Swedish process?’ CPI played the role to improve the Swedish process. In addition, I discussed a lot of possibilities to do other improvements for the Chinese process, maybe they are unfeasible, but it is significant to discuss these possibilities here for the future improving.

Such research journey is really a laborious process. Although the result of this thesis is not perfect, it could evoke the consideration for the Chinese process, especially for the future study.
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