

# Study on Risks of Medical Industry Ecommerce Based on Supply Chain Management

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**Abstract:** From the point of view of cost-reduction and benefit-improvement, this paper puts up with a new E-Commerce mode for the medical industry—E-Commerce based on supply chain management (SCM). At the same time, this paper qualitatively analyzes the risks of the mode, including risk of management, risk of technology, risk of human resource and risk of the mode itself. At last, the paper puts forward a set of risk management models for this E-Commerce mode according to the basic principles of project management.

**Keywords:** E-commerce; Risk analysis; Medical industry; Management; Model.

## I. Introduction

The medical industry is a traditional basic industry with very wide development prospect and it is also one of the industries of the national economy with the fastest developing speed. China has already become the big medical country of the world.<sup>[1]</sup> The medical industry of China has already built up comparatively perfect industrial system and circulating network. The output and kinds of the medicine stand on the top of the world. The medical industry is now breaking the yoke of long-term planning economy and the property right structure is being developed in the pluralistic directions.<sup>[1]</sup> Furthermore, the opening of medical industry has made great achievement. At present, the most important thing for the development of medical industry lies in how to utilize the modern information technology means to tackle the opportunity and challenge of joining the World Trade Organization (WTO).<sup>[1]</sup>

The medical industry E-Commerce refers to the medical trade platform that the network members include the medical organizations, pharmaceuticals, banks, medicines manufacturers, medicinal information service providers and insurance companies.<sup>[1]</sup> And it offers a safe, reliable, open and medicinal trade platform for users that is easy to maintain.

## II. Medical Industry E-Commerce Based on Supply Chain Management (SCM)

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### II.1 Basic Principles of E-Commerce Based on SCM

The basic principles of E-Commerce based on SCM lies in "Greatly lower costs by reducing intermediate links of medicine supply chain utilizing the basic principle of supply chain management, which can really show the advantages of E-Commerce over traditional trade". The supply chain here means the concept that "the third party supply chain management service". It is a very creative mode and its service range is showed as the figure below.<sup>[1]</sup>

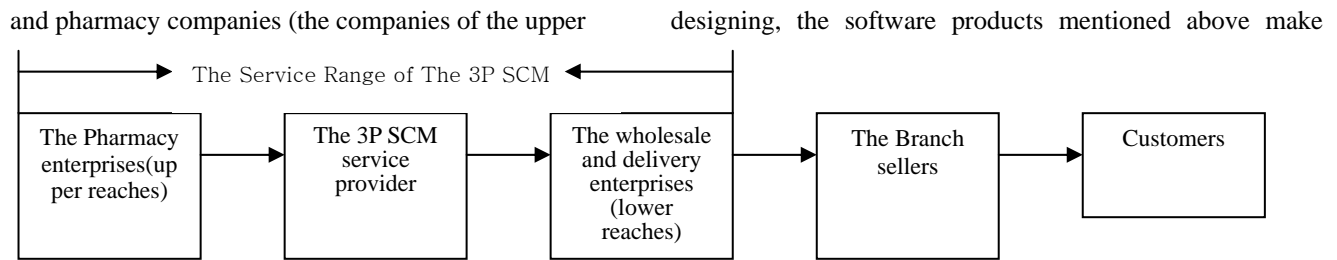
### II.2 the Make Up Of E-Commerce Based On SCM

The center of E-Commerce based on SCM lies not in technological solution, but technology is the supporting platform of this mode to launch supply chain management service. From the view of technology, E-Commerce based on SCM can summarize as "three system, building databases on two levels". The three systems so-called include an E-Commerce website, a regional home-delivery center website and the chain drugstore management system. "Building databases on two levels" means regional medicinal database and national medicinal database.<sup>[1]</sup>

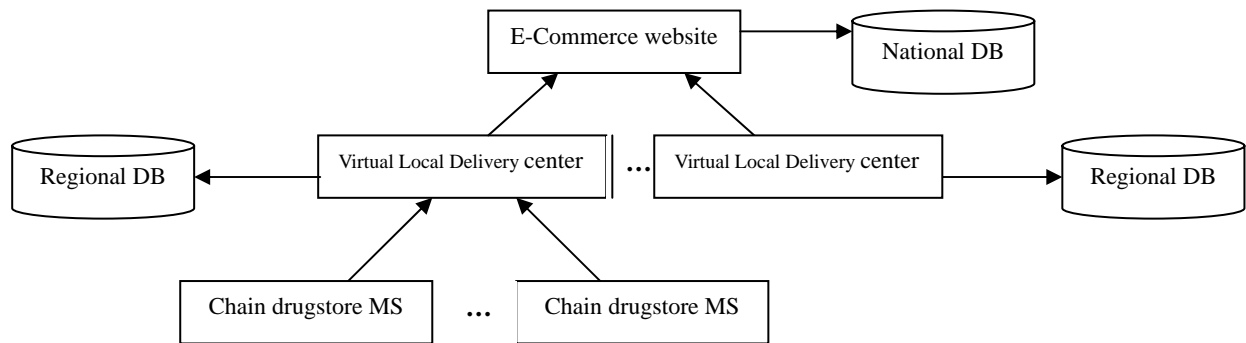
The above-mentioned content constitutes the basic support of forming the E-Commerce based on SCM. This can show as figure 2.

In E-Commerce based on SCM, the main functions of all the components should be as follows:

- 1) **E-Commerce website:** it is a window for the E-Commerce platform for the mode. It collects key data in all areas in the country, and it is responsible for analyzing the industry and issuing information.
- 2) **Virtual local delivery center:** It's the operational center of the mode, which takes charge of the supply chain management for local area and it also corresponds to information service. The center adopts organizational form of "virtual enterprise", which is organized according to the requirements of "three kinds of companies, two kinds of supporting systems" for the third party supply chain management service. Essentially, it is a virtual delivery center based on Internet. What is called "three kinds of companies" is used to indicate the three parties of "virtual enterprise". The three parties are companies that provide the third party supply chain management service, medicinal wholesale companies (the companies of low reaches)



**Figure 1: The Service Range of the 3P SCM**



**Figure 2: Support Platform for E-Commerce Based On SCM**

reaches). The two supporting systems refer to regional delivery center websites, which orientate to medicinal trade services in certain area and logistic delivery system.

- 3) **The chain drugstore management system:** It is the supplementary part for operations of the mode, it aims at medicinal chain enterprises and it offers the internal informatization solutions for enterprises. It mainly acts as “a stepping-stone to success” among the whole E-Commerce mode system. The chain drugstore management system is mostly used to collect sales data of each drugstore and upload them to regional database.

### III. Risks of E-Commerce Based on SCM

Risk refers to the possibility of loss or injury.<sup>[2]</sup> To analyze the risk of this E-Commerce based on SCM, this paper defines the risks from several points of view.

1) **Risk of human resource:** this kind of risk refers to the condition under which senior employees who carry this mode for a corporation quit, The design of service product, management decisions and organization will all be influenced. If important technical staffers leave the company, software technology will lose. This means the decline of research ability in the company and accordingly the mode will probably be lost. If the relevant employees of marketing department leave, the customers of this mode will be influenced.

2) **Risks of technology:** E-Commerce website, regional home-delivery center website and chain drugstore management system are main technical support platform for the mode to be realized. Though during the course of

every effort to keep being in the lead. With the progress of science and technology, there will be more advanced technology, especially in the industry of the computer. The speed of renewal of knowledge will be very fast. This forms the risk of technology, which will result in backwardness of developed software performance and suitability and then lose already existing market competitive abilities.

3) **Risk of management:** Managing risk mainly comes from reliance on main administrators and the management and administration integration capability of administrators. Companies implementing this mode must have better cohesiveness. If the main administrators left the company because of various kinds of reasons, this mode is difficult to operate according to the established route successfully. In addition, if administrators have inadequate experience on management and inaccurate knowledge to realize what market demand, all these will cause risks, such as marketing insufficient, new product lacking of suitability and managing enterprise improperly, thus they enable expecting benefit discounted.

4) **Internal risk:** the characteristics of this mode lie in that it offers the third party supply chain management service. From the analysis above we can

### IV. Risk Management Model for E-Commerce Based on SCM

What is most important for risk analysis is how to manage the risks and avoid loss. Therefore, basing on the qualitative analysis of the risks of this kind of E-Commerce mode, this paper will put forward a set of risk management models that

is based on the principle of project management for E-Commerce based on SCM, including risk identification model, risk assessment model and risk monitoring model.

#### IV. 1 The Six Processes of Risk Management

In the book "IT Project Management" written by Kathy Schwalbe, the author made a summary of the processes of risk management. The major processes involved in risk management include:<sup>[2]</sup>

Risk management planning, Risk identification, Qualitative risk analysis, Quantitative risk analysis, Risk response planning and Risk monitoring and control. The six processes above could be described as the follow figure3. This is the basic principle for the risk management model put forward in this paper.

#### IV. 2 Risk Management Models for E-Commerce Based On SCM

##### IV. 2. 1 Risk Identification Model--Fault Tree Method

This paper considers that it is a good way to identify the risk of the E-Commerce mode with the fault tree method. This method uses a graphic way to divide a large risk into several kinds of small risks. Or analyze the reasons for the risks. This is an advantageous tool for risk identification. In analyzing the risks of the E-Commerce mode, this method uses a tree-shaped figure to describe the risks of the E-Commerce mode with a way of from roughness to details and arrange according to different levels. It is easier to find all the risk elements because of the definitive relationship among them. The principle of fault tree method shows as the figure 4 below.

##### IV. 2. 2 Risk Assessment Model--Risk Assessment Table

There are many methods for risk assessment. In this paper, the method "risk assessment table method" would be adopted. During the procedure of risk analysis, a four-dimension array would be built.

$$Array=[R_i, L_i, X_i, Y_i]$$

In this array:

$R_i$ --Risk;

$L_i$ —the possibility of the risk;

$X_i$ —the loss of risk;

$Y_i$ —the expectation of risk

To most of the IT project like the medical industry E-Commerce based on SCM in this paper, the risk factors including the cost of development, cost for human resource, technological support, the performance of the web platform constitute a typical frame of reference for risks. That is to say that there exists an average at which would lead to the termination of the project if one of the following situations exists: the development cost exceeds, difficult to technological support, cost of human recourse exceeds and so on.

In the analysis of the risk for the E-Commerce mode, if one or more factors exceed the average, the project would have to be stop.

If the risk of the E-Commerce mode reaches the critical point, then it could be judged from the performance analysis, cost analysis and quality analysis to decide whether the project should be terminated or not. This paper takes the software (web platform) and the development cost as an example. Showed as figure 5 below.

In reality, the reference point usually forms a easily changeable section but not the smooth curve showed on the figure 5. Therefore, this paper considers that when assessing the risk for the E-Commerce mode, the following steps should be followed.

- 1) Define a risk average reference value;
- 2) Find the relationship between each array of [ $R_i$ ,  $L_i$ ,  $X_i$ ,  $Y_i$ ] and its risk average reference value;
- 3) Assess an array of critical point for the termination section of the E-Commerce mode;
- 4) Assess how the risk assemble influences the risk average reference value. That is the extent to which the project should be terminated.

The following table1 is a risk assessment table, which is made up of risk, possibility of loss, loss and the expectation by using the platform performance and cost of development as frame of reference.

Table 1: Risk Assessment Table

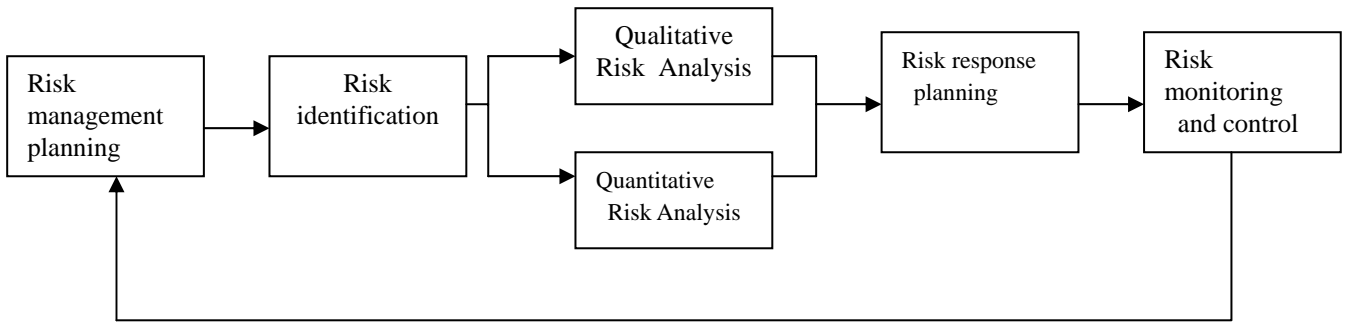
Risk $R_i$	Loss possibility $L_i$	Loss $X_i$ (US\$)	Expectation $Y_i$ (US\$)
Not support multi-users	30%	5000	1500
Sloe database connection	20%	4000	800
difficult to re-development	50%	25000	12500
Difficult to update or maintain the database	30%	12500	4000
not friendly user interface	20%-30%	2500	1500-2000

In table 1, the persons who are familiar with the platform should confirm the loss possibility. For Example, using the Delphi Method. Each person assesses the every risk independently, and discusses the reasonability of each assessment round by round until the final decision reached.

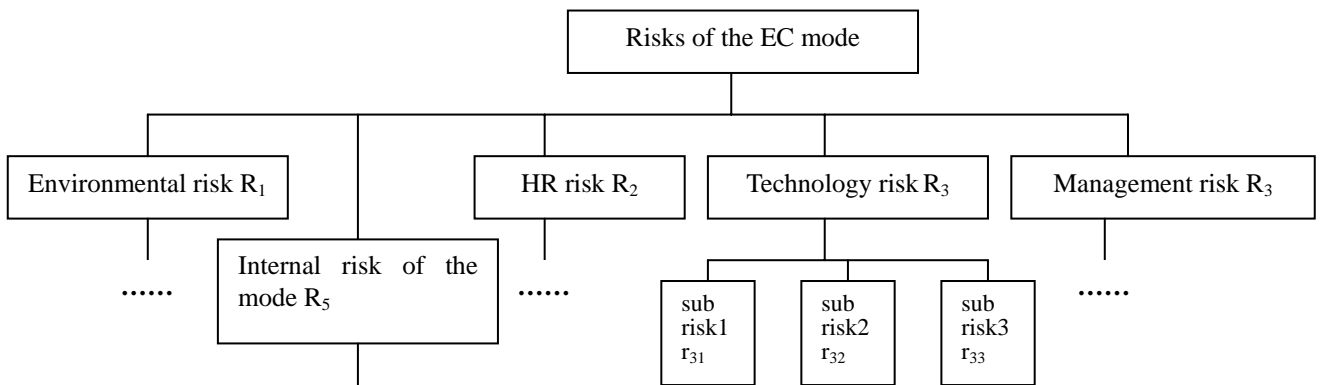
##### IV. 2. 3 Risk Monitoring Model

Since it is difficult to determine the influence of time on the E-Commerce mode, therefore, risk monitoring becomes an important job for implementation of the E-Commerce mode. Risk monitoring refers to monitoring the products (here mainly refers to the platform and the management system for chain medicine stores) , the progress of the project and the change of environment. Under most condition, the information will increase with the time, the uncertainties would descend and the risk-monitoring job would be more and more complex. Risk monitoring for the E-Commerce

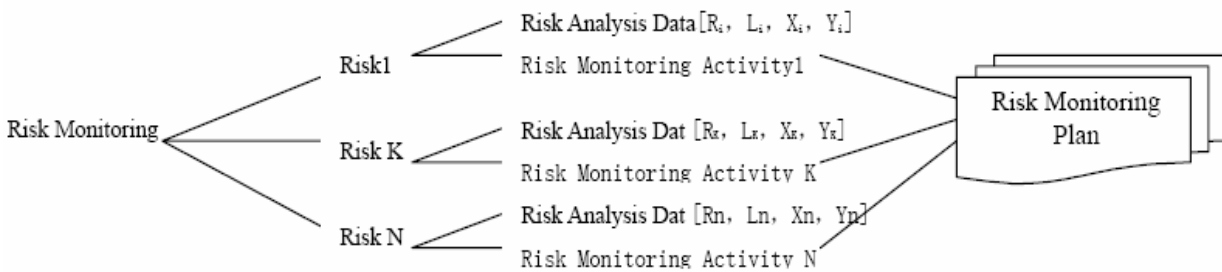
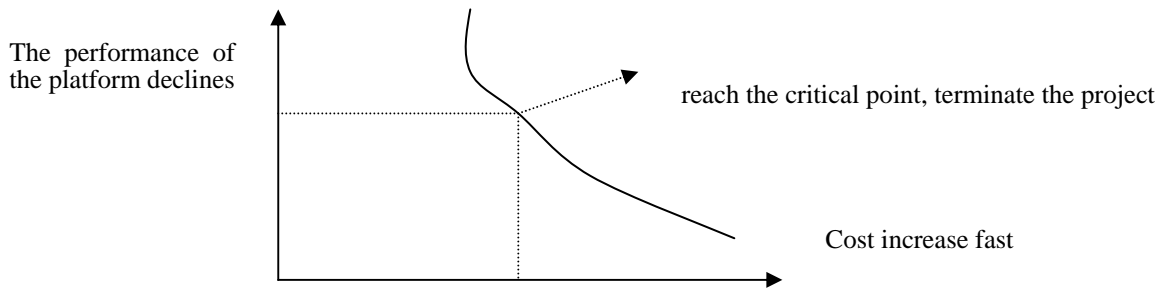
mode here is mainly executed by experienced management staff. It adopts the prototype method in project management,



**Figure3: Six Processes of Risk Management**



**Figure 4: Principle of Fault Tree Method**



**Figure 6 : Risk Monitoring Activities**

software psychology and so on to avoid and transfer risks. This risk monitoring activities could be showed as figure 6. That is risk monitoring activity, in this paper, the method "ten risk events listing table" is adopted as the best efficient tool for risk monitoring. It is a tool that could keep a sense of risk through the whole life cycle of IT project, so as for the E-Commerce mode here. The listing table includes: the rank at present, the rank of last, the number of occurrence on the table in a special period and the avoiding progress for the risk. Table 2 is an example for the E-Commerce mode risks event list. The project manager checks the table every week and re-considers the risk events and pays more attention to the changes happen.

**Table 2 Ten Risk Events Listing Table**

Risk Event	Rank of this month	Rank of last month	Number of occurrence	Risk avoiding progress
difficult to re-develop	1	2	3	redesign the database
bad design	2	4	2	design according to the norms
could not submit the developing tools on time	3	5	5	the purchasing department has regarded it as the highest priority
not well planning	4	1	2	modify the whole plan
...	...	...	...	...

## V Conclusion

Medical industry E-Commerce develops very fast in China as well as all over the world. And its development would take place in a more and more complex and dynamic environment that included high levels of uncertainty and risk.

In this mode for the medical industry E-Commerce, investment risk would be most highly concerned since the revenue would be low at the beginning of the project. As a result of fact, legal measures would have to adopted to preventing the investor from withdrawing his or her investment. Moreover, human resource risk is also an important concern. It is a new project for the study of risk of E-Commerce development, here this paper could not describe every aspect in detail. And this paper only provides a set of theoretical methods for risk management of E-commerce development both for medical industry and other industries; it should be penetrated into further research.

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