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Development and Strategies of E-commerce Patents

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ABSTRACT

Internet and information technologies break the transaction barriers, and the permission of the patentable subject matter for business methods and software acts as the moving power for enterprises entering into the knowledge competition age. Computer software can be a patentable subject matter is the inevitable consequence of the development of technology and law, while the patentability of business methods reflects that the advantages of industry competitiveness have shifted from labor to knowledge and innovation. This study analyzes the quantity and trends of e-commerce related patents, and clarify the concepts of patentable subject matter regarding business methods. Since United States is the leading country in the e-commerce and the patent system, decisions and patent statistics of United States are considered as the references in this study. In addition, a set of innovation and patent strategies for enterprises is also proposed to deal with the patent barriers established by technology leaders.

INTRODUCTION

Industries traditionally rely on land, labors, and mechanical tools or devices to create fortune. However, only knowledge and information can create competitive advantages when the e-commerce age is coming. Protection and application of intellectual property rights therefore become important tasks on the aspects of competition and survival of enterprises. The uses of Internet and information technologies make the mode of business transactions and products digitized, which prompt managers not only to innovatively develop technologies, but also to combine the innovative technologies and methods of doing business (hereafter referred to "business methods") to apply to the transactions and services of e-commerce. These transactions and service are managed by using a variety of algorithms with the aid of computer software or systems to treat the tasks of the transmission, detection, link, and control of data. Manners of life, business, operation of enterprises, service and transactions are changed due to the reason that the integration of application of software and Internet, making tangible structures digitized and changing the operation modes of data search, transmission and reception. Because the employed technologies of data treatment can be applied to different kinds of industries and Internet has the characteristics of no limitation on time and space, the potential value create by the technologies is immeasurable. It is well known that patent rights can offer numerous advantages for enterprises, such as (1) providing the exclusive protection of the embodied implementation of innovative concepts, (2) acting as the aggressive weapon to exclude competitors and protect the market shares, (3) acting as the defense weapon in the litigation or patent disputes to protect R & D and investments and to increase the opportunity of licensing, (4) attracting venture capitalists to invest the company or increasing the profits by licensing, etc. Only when these technologies and innovative business methods are protected through the patent system can they provide the great exclusive rights for enterprises to maintain their competitiveness.

The announcement of examination guidelines for computer-related inventions by The Patent and Trademark Office of United States (USPTO) [21] and the decisions of U.S. Court of Appeals for the Federal Circuit (CAFC) in the cases of State Street Bank v. Signature [20] and AT&T v. Excel Communications [1] positively made that inventions about the business methods are treated like any other process invention and that the subject matter can be patentable if it can generate "useful, concrete, and tangible" results. The guidelines and decisions bring the effects that the software and services as well as procedures for dealing with information management can also obtain the same protection as hardware and physical structures through the mechanisms of patent system. In short, the software and the service offered by using Internet can be applied for and granted patents if they have practical application and satisfy the requirements of patentability. All the patents related these fields are named "e-patents".

There have been many literatures and publications discussed the possible problems and strategies related to the grant of e-patents [2][4][5][6][7][8][12]. However, none of any publications or literatures thoroughly analyzed the developing trend of e-patents, which has the closed relation with enterprises' policies on developing the activities related to e-commerce. Besides, no publications or literatures have proposed the suggestions for the technology followers to treat the issues about e-patents.

The purpose of this study is to investigate the development and trend of e-patents in different areas. In addition, since there exists opposition about the granting of business method patents due to the misunderstanding about the patent system, this study will be to clarify the concepts between the application of business methods and business method per se, which the later one cannot be the patentable subject matter. Furthermore, since many e-patents have been applied and granted in the e-commerce leading country, United States, the enterprises of following countries may encounter patent disputes if they perform their business or use software that covered by the claims of existing patents. Therefore, enterprises should develop a series of strategies to dealing with issues related to e-patents. This study will propose a set of patent strategies for technology followers from the aspect of the concept of life cycles to overcome the crisis brought by the possibilities of infringing existing patents.

DEVELOPING TREND OF E-COMMERCE PATENTS

An invention can be a patentable subject matter if it has practical application even though it is implemented in business activities or carried out by computers or software [1][20]. Since the criteria for patent subject matters have been clarified and the actual or potential economic values can be created through the application of Internet, many enterprises, especially those in United States, have developed various innovative business methods, applied technologies in Internet, or application of software and databases, and applied them for patents. This phenomenon leads to the rapid increase on the application and grant of e-commerce and software related patents.

Category of U.S. Business Method Patents: UPC 705

USPTO classify business method patents into UPC (U.S. Patent Classification) 705. The scopes of UPC 705 cover the financial, business practice, management, or cost/price determination. According to the definition of UPC 705, the patented invention in that class can be distinguished into three categories [22]:

1. apparatus and corresponding methods for performing data processing operations, in which there is a significant change in the data or for performing calculation operations wherein the apparatus or method is uniquely designed for or utilized in the practice, administration, or management of an enterprise, or in the processing of financial data,
2. apparatus and corresponding methods for performing data processing or calculating operations in which a charge for goods or services is determined, and
3. subject matter described in the two sorts above in combination with cryptographic apparatus or method.

According to the investigation of granted patents about e-commerce related patents, the international patent classification (IPC), and the required technologies and process that are applied on e-commerce, the patented invention related to e-commerce can be categorized as listed in Table 1.

TABLE 1 Ecommerce Related Patent Categories with Respect to IPC.

IPC	Definition [11]
G06F 17/60	Administrative, commercial, managerial, supervisory or forecasting purposes (electronic cash registers other than digital data processing aspects thereof
H04L 9/00	Arrangements for secret or secure communication
G06F 15/30	Other modes related to transactions
G06F 17/30	Information retrieval; Database structures therefor
G06F 19/00	Digital computing or data processing equipment or methods, specially adapted for specific application
G06F 17/00	Digital computing or data processing equipment or methods, specially adapted for specific functions
H04L 9/32	Includes means for verifying the identity or authority of a user of the system
G06F 13/00	Interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units
H04L 9/30	Public key, i.e. encryption algorithm being computationally infeasible to invert and users' encryption keys not requiring secrecy
G06F 11/00	Error detection; Error correction; Monitoring
H04M 3/42	Systems providing special services or facilities to subscribers

Trend and Analysis of E-commerce Related Patents

Table 2 is the number of e-commerce related patents over the two decades searched from the DELPHION patent database. UPC 705 with each individual IPC are considered together in a search. Figure 1 shows the trend of e-commerce related patents in terms of IPC. It can be found from Figure 1 and Table 2 that most of e-commerce related patents are concentrated on G06F 17/60 and H04L 9/00 of IPC, in which G06F 17/60 represents patents related to business models while H04L 9/00 involves with securities of transactions.

Table 2 also indicates that the total number of granted patents in UPC 705 from 1981 to August 8, 2001 is 5851, while e-commerce related patents account for 2712. This information reveals that although activities about e-commerce begin to develop vigorously in recent years, the number of e-commerce related patents account for half of business method patents categorized by UPC 705.

Life Cycle of Technology Development

Technologies, like products, also have life cycles and can be described by four stages, namely the market introduction, growth, maturity and decline. The technology development life cycle can be observed from the variation of statistic data of patents. Among them, the observation of the development of granted patents and the number of applicants, as shown in Figure 2, is the typical method to understand the trend of technology development [14]. Reflecting the small number of enterprises involved in active technological development, the amount of patent application in the market introduction stage is relatively small (stage I in Figure 2). During the growth stage, however, the number of applicants and the total number of patents grow rapidly (stage II in Figure 2). During the maturity stage, the number of enterprises still investing in research and development (R&D) for a product decreases, although technological developments continue (stage III in Figure 2). During the decline stage, the total amount of patents filed and enterprise investments decrease rapidly (stages IV and V in Figure 2).

TABLE 2 Number of E-commerce Related Patents.

IPC / Year	G06F 17/60	H04L 9/00	G06F 15/30	G06F 17/30	G06F 19/00	G06F 17/00	H04L 9/32	G06F 3/00	H04L 9/30	G06F 11/00	H04M 3/42	Total
1981		8	5									13
1982		5	5									10
1983		4	3									7
1984		4	4							1		9
1985		2	7					1		2		12
1986		6	14					1		0		21
1987		12	13					3		3		31
1988		8	12					0		0		20
1989		19	14					2		1		36
1990		15	19				1	2	3	1		41
1991		13	10				4	0	2	0		29
1992		4	7				4	1	1	0		17
1993		11	16				10	3	1	0		41
1994		17	11				8	3	3	1		43
1995	13	17	8	2	7	5	7	2	3	1	1	66
1996	46	34	2	5	15	12	10	2	7	1	0	134
1997	73	63	3	25	17	10	18	7	8	2	1	227
1998	199	113	2	43	37	28	36	15	20	5	1	499
1999	359	119	14	50	53	53	13	15	10	4	0	690
2000	505	58	7	76	38	73	13	5	10	7	2	794
Sum/ Class	1195	532	176	201	167	181	124	62	68	29	5	2740

Investigated Date: August 7, 2001

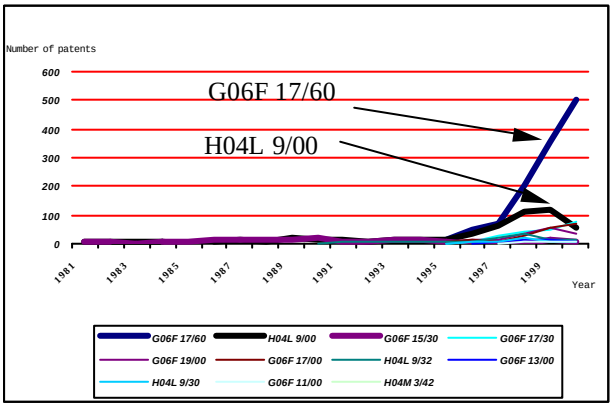

FIGURE 1 Trend of E-commerce Related Patents in Different Categories.

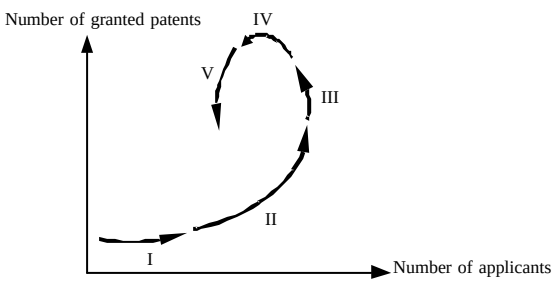

FIGURE 2 Technology Development Life Cycle.

Analysis of the Life Cycle for E-Commerce Business Method Patents

E-commerce business method patents defined in this study are the invention that falls in the UPC 705 and IPC G06F 17/60 simultaneously. The number of patents in this category is 1429 until August 7, 2001. The number of assignees and the number of patents over years are listed in Table 3. It can be found from Figure 3 and Table 3 that this category is at the growth stage since the number of applicants and the total number of patents grows rapidly. In other words, the application of e-commerce rapidly develops and prevails.

TABLE 3 The Number of Assignees and Patents of E-commerce Business Method Patents.

Year	1995	1996	1997	1998	1999	2000	2001 (August 7)
Number of assignees	13	43	73	160	260	342	188
Number of patents	13	46	73	199	359	505	234

Investigated Date: August 7, 2001

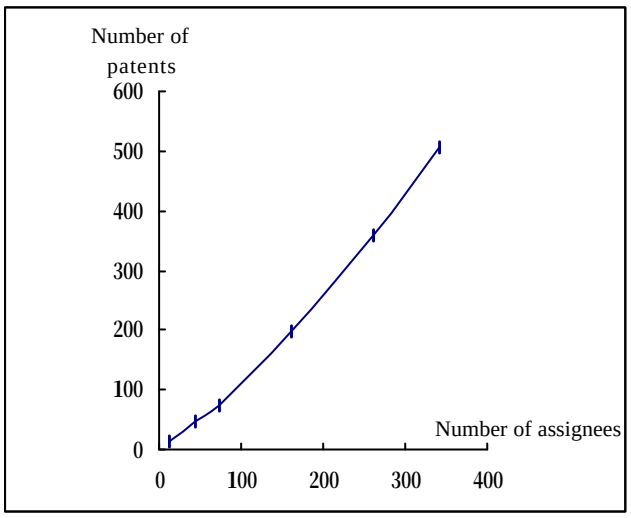

FIGURE 3 Life Cycle of E-commerce Business Method Patents.

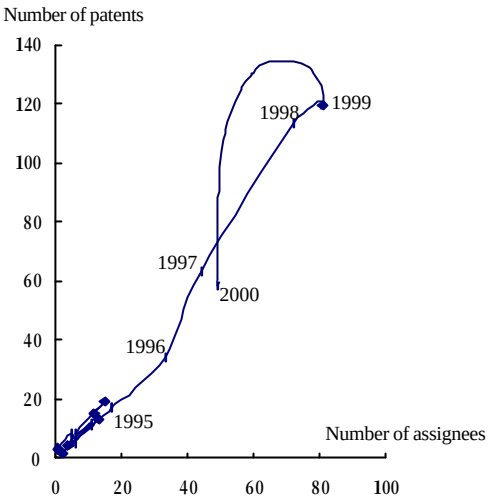

FIGURE 4 Life Cycle of E-commerce Security Patents.

Analysis of the Life Cycle for E-Commerce Security Patents

E-commerce business method patents defined in this study are the invention that falls in the UPC 705 and IPC H04L 09/00 simultaneously. The development of patents that is related to the security of transactions, as shown from Table 4 and Figure 4, has been stationary and even negative. This shows that the technologies of this category are maturer than those of business methods

TABLE 4 The Number of Assignees and Patents of E-commerce Security Patents.

Year	1981	1982	1983	1984	1985	1986	1987
Number of assignees	5	6	4	4	2	5	11
Number of patents	8	5	4	4	2	6	12
Year	1988	1989	1990	1991	1992	1993	1994
Number of assignees	6	15	12	13	4	11	17
Number of patents	8	19	15	13	4	11	17
Year	1995	1996	1997	1998	1999	2000	2001 (August 7)
Number of assignees	17	33	44	72	81	49	31
Number of patents	17	34	63	113	119	58	35

Investigated Date: August 7, 2001

CONTROVERSIES AND CLASSIFICATION OF BUSINESS METHOD PATENTS

The attitude of CAFC regarding the support of business method patents and the increased number on the aspect of e-commerce related patents have led to serious and wide discussions recently. According to the CAFC's decisions in State Street Bank and AT & T, respectively, if an invention can generate useful, concrete and tangible results or have practical application, it can be a patentable subject matter even though no physical transformation occurs. It seems that an invention can be as a patentable subject matter if practical uses can be observed or described in the claims of a patent.

Those who support CAFC's decisions and actions of USPTO consider that the value of business methods is not merely on the technologies per se that carry out the methods but mainly comes from the early movement into markets and the concepts of business methods per se. For instance, the economic value of Amazon.com lies in the famous trademark, rich information on various goods, methods of ordering products, and the skill of integration of supply chain to attract customers and transform the orders into supply lists of suppliers and distribution of distributors. However, since the person skilled in the art of software and hardware of Internet can easily carry out the similar ordering or other information treatment process, competitors can easily imitate such a concept of operation. If the concepts combined with the required technologies cannot be protected by law, the competitive advantage will disappear easily.

The opposite contest that subject matters of business method patents related to e-commerce are merely the combination of traditional business methods and application of Internet. Although the purposes of the patent system is to protect the intellectual properties and provide incentive to innovate and stimulate industries to continuously grow [19], the scope of claims of a business method patent is too broad to block the normal operation of competitors. As a consequence, the development of industries is limited.

Clarification of Patentable Subject Matter

Whether an invention can be a patentable subject matter must inquire that if it merely describes an abstract idea or has disclosed the technologies or procedures that can

implement the invention. Only when the specification and claims of a patent has disclosed the technologies or procedures that can embody the concept of invention can it be necessary to further investigate whether the innovation of the business method satisfies the novelty and non-obviousness.

In fact, the patentable subject matter in the area of e-commerce is the combination of the concept of business method and the required technologies that implement the business method. Although CAFC's decisions do not preclude methods of doing business from being patentable subject matter, it does not mean that a business method without embodied technologies can be patentable.

A business method per se only describes a concept or mental process and hence cannot be a patentable subject matter because the concept has not been embodied. There are three reasons as follows that can illustrate the policy:

1. An abstract idea or concept cannot generate practical results. Additional procedures of implementation are required for the concept to be carried out.
2. An abstract idea cannot disclose definite scope of claims or usable techniques.
3. An abstract idea has numerous and indefinite embodiments. If a patent is granted for an abstract idea, it will limit the development of industries and thus violate the essentiality of the patent system.

In short, it is a misunderstanding that a concept of business method can be the subject matter if inventors can present the practical application. A business method can be a patentable subject matter only when the concept is disclosed with enforceable techniques or procedures to obtain the claimed results. Although the subject matter that inventors and patent owners want to protect is the business method per se, however, the patent system can not provide such protection. The patent system can only provide protection for those embodied technologies that use substantially the same way to perform the substantially the same function and obtain the substantially the same result. If the business method related to e-commerce have different embodied technologies or procedures, the patent law will give the same exclusive rights for different inventors that discloses different technologies. An inventor cannot request the patent law to protect the business method per se merely because he/she discovers or innovates that method. On the contrary, the inventor should investigate all possible technologies that can implement the concept of the business method and applies the combination of the concept of the business method and related technologies for patents.

STRATEGIES OF E-COMERCE PATENTS

E-commerce and its application are developing rapidly in recently years. Different kinds of business methods have also been applied for patents. During these years, numerous patents related to business methods as well as architectures and requirements of e-commerce have been granted because of (1) the rapid improvements on Internet and information technologies, (3) enterprises' emphasis on intellectual property rights, (3) definite expression about patentable subject matters, and (4) enhancement of efficiency of patent examination. The number of patents related to e-commerce is increased exponentially. It can be predicted that patent disputes about e-commerce will occur frequently in this century. Someone abbreviates "Internet business method patents" to "I-BMP", similar pronunciation with "I-Bomb", to indicate the explosive impacts caused by e-commerce related patents.

United States announced "examination guidelines for computer-related inventions" earlier than Japan, Taiwan, and other countries or regions. The European Patent office even did not consider the patentability of business methods until year 2000 [18]. Although enterprises, in addition to those located in United States, have adopted Internet and other information technologies to establish operations within and among enterprises, they may infringe existing patents if the applied technologies fall into the scope of claims.

Innovation and Patent Strategies

E-commerce and Internet is another revolution of technologies and industries as observing from the development of histories of human being and innovation. Industries and products will experience different evolution and innovation under the impact of innovative technologies. If technology followers can capture the regularity of variation of technologies and industries, understand the characteristics of industries at different stages of life cycles, and match with characteristics of local activities as well as the interaction relationship with other industries, they can still have different extent and types of innovation. In short, although many inventions about e-commerce have been protected by patents, enterprises can still have rooms of innovation if they adopt appropriate innovation methods and patent strategies according to the characteristics and requirements of industries.

Since enterprises are now in the global competition environment, management strategies should be considered with technology and patent strategies when industries are at different stages of the life cycle.

1. *Patent applications are filed as many as possible with considering the quality of patents at the market introduction stage*. Life cycles, as shown in Figure 5, are often adopted in the industry analysis to describe the behaviors of industries, products, and technology development. When an emerging industry is at the initial development stage, industry-related technologies or products have not been standardized and the market position is also not obvious. If enterprises that enter into the market at this stage want to become technology leaders, they must cross the "chasm" (for instance, how to become the supplier of the standard of products or technologies) [15][16]. Those who early cross the chasm can have the possibility of becoming leaders and hence become the mainstream in the later stage of the life cycle. If (1) the enterprise can not overcome the shortcomings existed in products and service, or (2) customers do not accept the products or services, or (3) the enterprise does not operate well, the enterprise may fall into the "chasm" when the industry or the product is from the market introduction stage into the growth stage.

E-commerce and related application are rapidly developing, however, the e-commerce industry is still at the transition between the introduction and growth stages as observed from the market developing status. Therefore, standard business models have not developed. Although an innovative business method that can be implemented by technologies can be granted patents, many innovative concepts are generated and replaced continuously at the introduction stage. Nevertheless, if the innovative business

method is a breakthrough, all the technologies related to the innovative business method should be applied for patents.

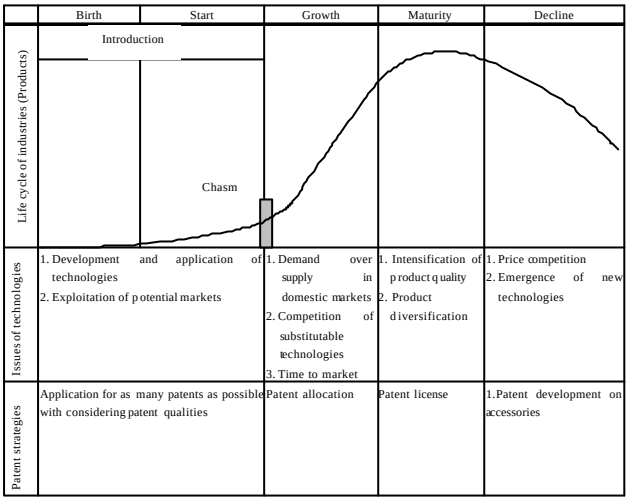

FIGURE 5 Patent Strategies at Different Stages of the Life Cycle.

2. Innovation methods and patent strategies should be modified when the industry or product (service) is at the different stages of the life cycle [3]. Because technologies and products in the initial stage of the life cycle are by definition new, research and development teams have no experience of such products and related technologies. Market needs and customer requirements are also uncertain. Additionally, only a few enterprises are pursuing such research because of the higher risks involved in the initial stage of research and development. Necessarily, knowledge and information about the products and technology is very poor. Therefore, technology and product innovation is only possible by combining science or relying on the research and development knowledge base. Managers or R & D teams should take the developed technologies to apply for patents after the evaluation of technology and business profit and the development plans.

At the growth stage, an increasing number of enterprises begin to innovate on related products and service. Substitutive technologies are consequently generated. The enterprises that enter into the market at the market introduction have accumulated considerable experience, and they can support further product and technological innovation. The innovation strategies adopted by enterprises at this stage are to refine the technologies (for instance, to enhance the stability) or add more functions. These improved or refined technologies and their application on business methods should also be applied for patents to establish the patent portfolio. In addition to provide stable and high quality of technologies or service, enterprises should also consider time to market so that maximum profit can be obtained. Most rising enterprises (REs) hope to shorten the research and development period of their products so that they can gain a market share. Additionally, product function and performance must closely mirror that of the technologically leading firms' (TLFs) products. Consequently, the research and development strategy for the REs during the growth stage is imitative innovation. The REs can develop products and technologies based on existing ones by using the general innovation methods, including reversal, transfer, combination, change of direction, extension, and reduction [13].

As the technologies and products mature, product and technological competition between enterprises has intensified. To increase competitiveness, enterprises must improve or redesign the technologies or process of service to fulfill customer requirements. Since technologies and business models of e-commerce have been fully developed and standardized and related information is abundant, enterprises that enter into the market at this stage require less time and cost to develop similar business models or provide similar service that TLFs have developed or provided. However, there may exist risk of patent infringements since competitors have applied for patents at the market introduction or growth stages. To avoid serious property damage and avoid bringing bad influence to enterprises, patent licensing is often treated as the means to solve the patent disputes. In addition, patent information management is also useful for managers to decide the development direction of enterprises. Managers and R & D can investigate related patents from database to understand the trend of patent development. The innovation results can be obtained by using skills of designing around patents [17] to prevent the results from falling into the scope of existing patent claims.

When products and technologies approach the decline stage of the life cycle, other new products and technologies may emerge. However, the newly emerging products remain embryonic and hence unable to replace the established ones. Therefore, the existing products retain their market value. Since the functions and technologies employed differ little among all kinds of products and technologies, price competitiveness is the main issue. If enterprises hope to survive, then when their ability to lower costs to extend profits is exhausted, other innovation should be considered, such as improvements on user interfaces, providing professional, real time and automatic consulting services, etc., to increase added value of technologies and services, which expand lifetime of products and technologies.

3. Technologies that are applied for patents should be evaluated by considering the technological and business value (market benefit) along with the firm's policies. If patented inventions cannot become the mainstream or have a short life cycle, worthless cost are existed to maintain patent. Innovative results with low benefit or application value can be disclosed through "technical disclosure bulletin" to deprive of the novelty so that competitors cannot take similar technologies to apply for patents.

4. Solving practical problems and developing unique innovation is another way to establish the niche market. Innovation of business methods is not less important than the innovation of technologies. Innovation of information technologies in theory and practice can substitute or design around existing patents. The innovation of business methods, however, should investigate and consider the implementation and procedures as well as other considerations (for instance, customer requirements) in the transactions and management of e-commerce.

It can be observed from the granted patents that business method patents related to e-commerce must be implemented by software. Therefore, innovation of business method patents should also consider the design and improvements on the functions of software. Glazier [6] has proposed ten

rules regarding the innovation of software patents and business methods to be applied generally on the Internet service, application of all kinds of software, insurance and financial service, virtual stores, etc. However, the development of software sometimes involves the establishment of new technologies or algorithms. These new technologies or algorithms should be tested for a long time to make sure the stability and quality, which requires higher cost. Therefore, the correct and efficient way of innovation is to seek a specific business model and find out all possible business methods related to the business model, and the business methods can be carried out by integrating or improving the known technologies or software. The directions of innovation can consider (1) the requirements of operation procedures of enterprises, (2) conventions of local transactions, (3) special business activities, and (4) activities that are not easily treated in the real world, or that require more human resources, or that can not satisfy customer requirements, etc., by combining the characteristics of Internet.

Additionally, enterprises can consider the following strategies when they deal with patent management and technology application:

1. cooperation of upstream and downstream enterprises through the common business activities to develop the patent cooperation and licensing,
2. grooming engineers to have the capabilities and habits to read and analyze patents through the establishment of patent database.
3. using Internet community, as shown in Figures 6 and 7 to exchange information for invalidating patents or getting another useful information ,
4. enhancing capabilities of patent construction, infringement evaluation, patent designing around and innovation.

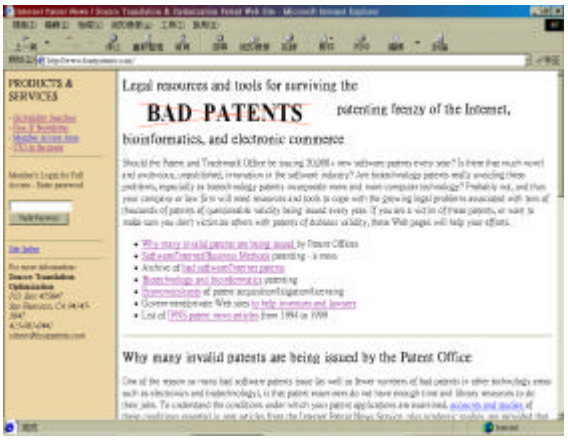

FIGURE 6 Website that Provides Legal Information and Report of Software and E-commerce Related Patents [9].

FIGURE 7 Website that Provides Bounties to Find out the Prior Art of Patents [10].

The most difficult but also important job of the patent management is the skill of patent analysis. The contents of patent analysis can be divided into two major categories, namely, (1) investigation of trends of technology development or the competitor's R & D and (2) constructions of disclosed technologies and claims. The manner of treatment of the former analysis can be made by using the keywords, such as those frequently employed by related industries or technologies, to search patents. Different patent information charts can be established from the results

The other kind of patent analysis, construction of patents, requires the experiences and assistance of patent engineers or attorneys. The process of patent analysis can be summarized as Table 5.

TABLE 5 Implementing Steps of Designing around Patents.

Step	Notes
1. Search and screen related patents	1. Searching and finding patents with appropriate keywords. 2. Screening and obtaining the patents that satisfy the requirements and related technology of projects.
2. Develop the abstract lists of patents	1. Listing the background of the invention and drawbacks of the prior art. 2. Understanding the purposes of each patented invention, such as the results and functions it obtains. Finding the employed techniques, methods, mechanisms or devices of resolving problems in the specification of the patent. 3. Pointing out the functions and the contributions of each employed techniques, methods, mechanisms or devices. 4. Writing down the claims and corresponding embodiments in the specification.

3. Discuss whether each element of a concerned independent claim is required or not	Eliminate unnecessary elements or steps of the claim.
4. Find out the limitations of claim terms of each element	Types of limitations including the numbers, positions, places, sequence of timing, etc.
5. List core techniques of the concerned patent	Finding out the must techniques in the patent by considering the purposes of the patented invention.

With following the steps listed in Table 5, R & D can capture the disclosed technologies and scope of claims in patents. Results of patent designing around can then obtained by following rules of designing around [17].

CONCLUSIONS

This study firstly investigates the development trend of e-commerce related patents, and then clarify the concepts of patentable subject matter regarding business methods. Finally, this study proposes a set of innovation and patent strategies for enterprises to deal with the patent barriers established by technology leaders. Based on the investigation of patent analysis and the viewpoint of the life cycle, e-commerce is still developing and is just "marching" into the growth stage although some "dot coms" have failed. Hence, the number of application of business method patents still increase.

From the viewpoint of evolution and development of law, the announcement that application of algorithms and business methods can be patentable subject matter presents the information that law always changes as time goes by. It also reveals that technologies and knowledge which can influence industry competition, no matter they are real or virtual, will be protected by the patent system. Since computer software has technological attributes, the copyright law, only protecting the express of ideas, cannot provide sufficient and complete protection. Computer software can be a patentable subject matter is inevitable consequence of the developments of technology and law, while the patentability of business methods just reflects that the advantages of industry competitiveness have shifted from labor to knowledge and innovation.

The progress of Internet and information technologies breaks the transaction barriers and also creates new directions of innovation on the aspects of products, technologies and services. Since patents have great exclusive rights and more and more enterprises emphasize application of patents, patents are often used as a weapon to exclude others from the markets. Therefore, technology followers should nimbly follow the development direction of technology leaders and continuously innovate to gain the possibility of patent cross-licensing. In short, enterprises should uses suitable research and development innovation sand patent strategies according the characteristics of the life cycle, as described in this study, to maximize business profitability and market shares.

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