

A COMPARATIVE STUDY ON E-COMMERCE RELATED TECHNOLOGY AND ITS PATENTABILITY BETWEEN CHINA AND THE U.S.

Ning Yu

School of Management, Huazhong University of Science and Technology,
1037 Luoyu Road, Wuhan, Postcode 430074, China,
E-mail: yuning@hust.edu.cn

Xiang Yu

School of Management, Huazhong University of Science and Technology,
1037 Luoyu Road, Wuhan, Postcode 430074, China,
E-mail: yuxiang6_5@hotmail.com

Abstract:

With the extensive use of online-business, the requirement of E-commerce related business method patents is getting greater. The E-commerce in China develops fast in recent years. In addition, China is the biggest E-commerce market in the world. But the study on patentability of E-commerce supporting platform technology are still in the initial stage, even blank. By contraries, it has already developed to a relevant mature stage in the U.S. It has experienced five stages, from non-patentability to patentability, since the beginning of the 20th century in the U.S.

This paper gives comparative analysis on the status quo and developing modes of E-commerce related business method patents between China and the U.S. Starting with the development history of E-commerce business method patent of China and the U.S., the paper suggests an interpretation on the existent form, characteristics and the current development of the E-commerce related business method patents. Subjects investigated are limited to method patents in E-commerce, especially technology patents. The analysis index includes application domain, applicants and IPC classification, etc. Under patent map and patent analysis theory, with the use of SooPAT analysis tool, the author shows comparative analysis of the differences related to patentability between China and the U.S.

In the end, according to the above study, based on innovation strategy, this paper proposes some targeted views on making full use of the advantages of E-commerce related business method patents. In order to encourage the technology innovation and protect the E-commerce related technology effectively, the author summarizes beneficial suggestions for the development and management of patentability in the field of E-commerce. The final purpose is to establish a harmonious, stable and efficient protecting and interest sharing system in China.

Key words: Patent Analysis; E-commerce business method patent; comparative study; innovation strategy

I. Introduction

1.1 New Rise of E-Commerce

With the development of Internet in the 21th Century, E-commerce is becoming important weapons in the competition among companies. Electronic commerce, commonly known as e-commerce, involves goods and services crossing borders electronically. Broadly speaking, e-commerce is the sale or purchase of goods or services conducted over the internet or other computer networks. An e-commerce transaction can be between enterprises, households, individuals, governments and other public or private organizations.^[1]

E-Commerce, the sales of which have multiplied at an astonishing rate, has developed rapidly since the birth. The sales of global E-Commerce in 1994 achieved only \$ 1,2 billion. In 2012, e-commerce sales topped \$1 trillion for the first time in history.^[2] In 2014, there were 600 million Internet users in China (twice as many than in the US), making it the world's biggest online market.^[3]

Accompanied by the rapid development, the strategic management of E-commerce is becoming more and more important, especially the protection of E-commerce business method patents.

1.2 E-Commerce business method patents

Business method patent includes simple business method patent for invention and business method relevant patent for invention. The former refers to the applications of patent for invention with the theme of simple business method; the latter refers to the applications of patent for invention with the theme of using computer and network technology to implement business method.^[4]

The main object of study is the patent for invention, the theme of which is to utilize computer and network technology to implement the business method. The range of study is down to a manageable proportions, which is among the internet companies.

II. History of Development

2.1 China

It can be divided into three stages that the development of relevant policies of business method patents in China:

Table 1 Development of relative policies about business method patents in China

Time	Legal Basis	Explanation	
Before Oct. 2004	<ul style="list-style-type: none"> ● <i>PATENT LAW OF THE PEOPLE'S REPUBLIC OF CHINA</i> (the Act) <i>Article 25</i>: For any of the following, no patent right shall be granted (2) rules and methods for mental activities; ● <i>Rules for examining patent applications for Business Method related inventions (proposed)</i> 	<ul style="list-style-type: none"> • Exclude business method, which is considered as “rules and methods of mental activities”, from any patent protection • Business method related patent applications are actualized completely by behavior of natural person. However, the State Intellectual Property Office (“SIPO”) examiners focus on the 	<p>In 2003: Two of applications for business method patent of National City Bank of New York were authorized : <i>electronic monetary system</i>^[5]; <i>computer system for data</i></p>

		“three technical elements”, nor the “mental element”	<i>management comprising a data processing system</i> ^[6] .
Oct. 2004 -Dec. 2008	<ul style="list-style-type: none"> ● <i>Rules for examining patent applications for Business Method related inventions (proposed)</i> ● <i>The Act: Article 5 (2)</i> ● <i>the Implementing Regulations of the Patent Law of the People’s Republic of China (the “regulations”)</i> (Then changed to the Act Article 2 (2)) 	<ul style="list-style-type: none"> • <i>the Guidelines for Patent Examination 2006</i> (the Guidelines) was promulgated in 2006, which is a substantive change to the Act and the Regulations. • To the applications for business method related inventions, SIPO examiners should consider the below thinking, if they belong to rules or methods for performing mental activities, if constitute the technical proposal, as the identification standard of the object of patent protection 	
From 2009	<p>Review idea: three methods of review: 1. Judging the protection range on the basis of background technology from specification or the common sense 2. According to the retrieved result, citing comparative documents to judge whether belongs to the object of patent protection 3. Commenting novelty and creativity on the basis of the retrieved existing technology</p>		

2.2 The U.S.

Stages of protection of Business method patents in the U.S.:

As a country regarding Case Law, the results of judgment form a series of jurimetrics related to business method in U.S. With the development of society, the jurimetircs about business method is changing regularly.

Table 2 Development of relative policies about business method patents in the U.S.

Stage	Typical Case	Explanation
Business methods exception	Hotelsecurity checking co. v. Lorraine co. ^[7]	<ul style="list-style-type: none"> • Form the idea that business methods exception. • If the business method don’t have connections with the excutive device, it’s not a technique.^[8]
	Funk Brithers Seed Co. V. Kalo Inoculant Co. ^[9]	Software and business method patent-ability exception
Mathematical algorithms and Computer Software exception	Gottschalk v. Benson ^[10]	Mathematical algorithms can’t be patented.
	Parker v. Flook ^[11]	laws of nature, physical phenomena, and abstract ideas are not patentable; a valid process patent may issue even if it does not

		include a machine or transformation matter ^[12]	
preliminary affirmation the patent-ability of software and business method	Diamond v. Diehr ^[13]	<ul style="list-style-type: none"> • The method invention can be patented, while the method is to utilize mathematic algorithm and computer to complete synthetic rubber. • a patentable method need not be tied to a machine or transformation of an article^[14] 	A turning point to use the patent law to protect business method
Reject mathematic algorithm and computer software exception	Arrhythmia ^[15]	Patent application for utilizing mathematical formula is accepted.	
Reject Business methods exception	In re Alappat ^[16]	If the invention involves “new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof”, ^[17] it has patent-ability.	Computer software was accepted to the protection range of <i>the Patent Law</i> in juridical practice gradually.
	State Street Bank ^[18]	the patent application need to produce “useful, concrete, and tangible result”---- State Street Test	Biggest transition, which changed the form of E-commerce development <ul style="list-style-type: none"> • Large amount of patents were granted by USPTO
Rethink	In re Bilski ^[19]	<ul style="list-style-type: none"> • The Court of Appeals for the Federal Circuit (CAFC) set an opinion on a definite test- “machine or transformation” test, which namely supported that a business method was patentable if it involved the use of a machine or transformed an article. • “an application of a law of nature or mathematical formula to a known structure 	

		or process may well be deserving of patent protection.” ^[20]
<p>Review Idea: Utility, Novelty, Non-obviousness</p> <p>The standard of review on the patent object is relatively loose. Most of business method patent applications are regulated by novelty and utility.</p> <p>The Non-obviousness standards of business methods and common patents are almost the same.</p>		

2.3 Summary

From the development history of E-commerce related policies in two countries, the author can conclude that, it is not an academic problem, but rather a question of fact, whether business method can be protected by patent right and become a theme of patent-ability or not.^[21] But the criteria for granting patent rights is different.

The State Intellectual Property Office of the P.R.C. (the SIPO) is also known to be relatively stringent in examining business method patent applications when compared to the U.S. Large and medium-size enterprises in China develop rapidly in recent years. The amount of patent application is in the growth stage. However, some domestic enterprises have weak awareness of patent, so that the current examine policies can't mobilize the initiative. In addition, the present situation cannot be improved in a short time.^[22]

The economy in the U.S. starts early and develop fast. The patent protection policies implement much earlier than developing countries such as China. Many large transnational corporations from the U.S. have established complete and proactive system of patent layout. All of these transnational coronations have also obvious technical advantages in their professional field. Those corporations tend to loosen up the request for examination of business method related patents, so that they could keep the high position in the industry and get maximum benefit.

III. Comparison

3.1 Technology life cycle

3.1.1 In China

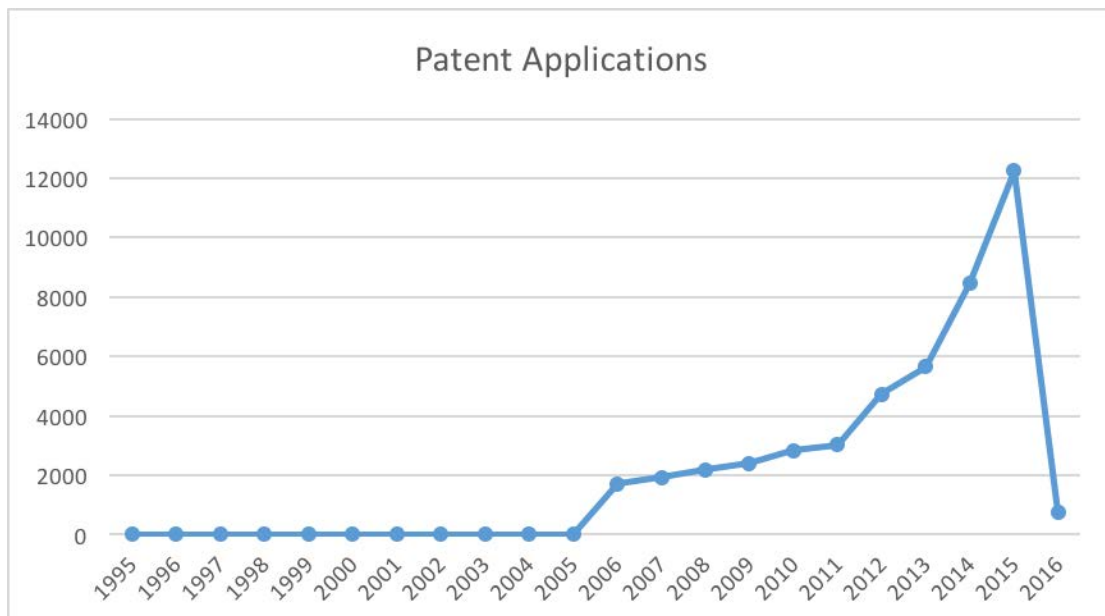


Figure 1 Variation Tendency of E-commerce business method patent applications in China

Table 3 Annual Applications of E-Commerce business method patents in China

Public announcement Year	Patent Quantity (pieces)	Public announcement Year	Patent Quantity (pieces)
2015	12256	2009	2407
2014	8466	2008	2184
2013	5653	2007	1928
2012	4720	2006	1718
2011	3016	2005	763
2010	2829		

Analyzing from Figure 1, we can see that, the number of applications for E-commerce business method patents in China remains zero until 2005 (2005 included). The number grows by leaps and bounds from 2006, with more than 1700 pieces. The State Intellectual Property Office of the P.R.C. (the SIPO) changed the examination standard of the business method patent materially. The SIPO began to regard business methods as patents for inventions. The regulation of examination defined “three technical elements” as guidelines, which provided a more specific review idea. The new review idea resulted in a rapid increase on the number of applications for business method patents. The amount of applications for E-Commerce business method patents maintain its growth from hereafter. The status maintains stable growth from 2005 to 2013. The amount of applications increased rapidly in recent two years and reached the peak in 2015, with the number of over 10,000. The author predicts boldly that the amount of applications will still increase in 2016, with the judgment from Figure 1.

The author concludes that the peak of authorization of E-commerce business method patents is coming. From the view of technology life cycle, related technologies still flourish. E-Commerce field’s technology life situates in growth stage. Large amounts of Internet companies flow in this emerging field through. The market has experienced from monopoly to competition.

3.1.2 In the U.S.

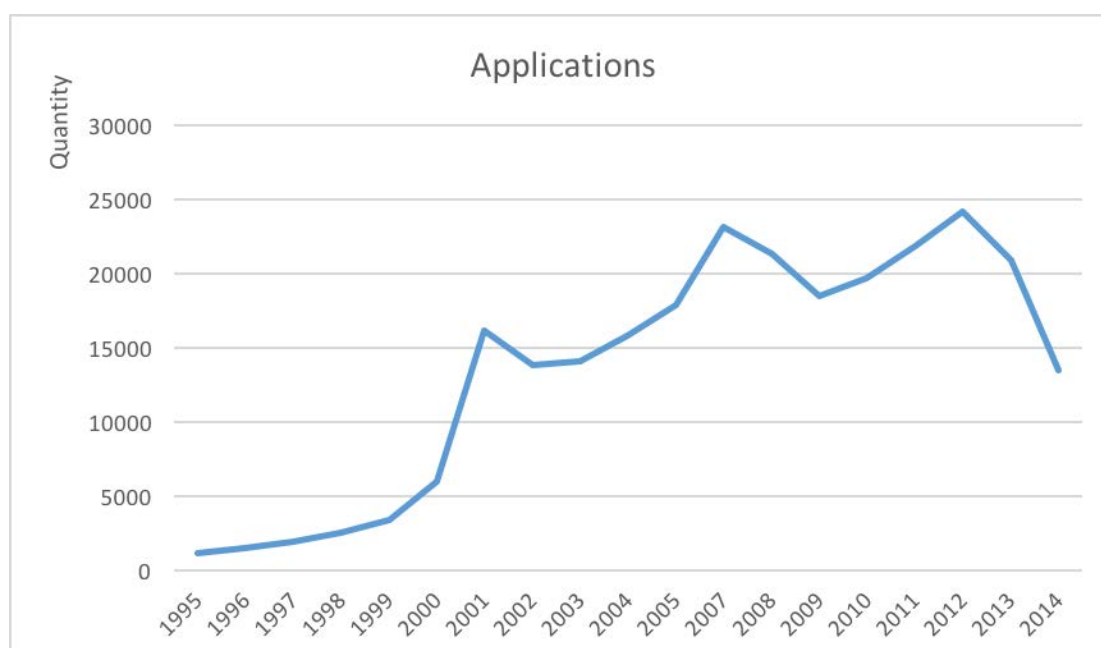


Figure 2 Variation Tendency of E-commerce business method patent applications in the U.S.

Table 4 the Amount of Applications for Business Method Patents in the U.S.

Year	%	Year	%
2014	13488	2004	15774
2013	20894	2003	14054
2012	24114	2002	13779
2011	21862	2001	16109
2010	19642	2000	5995
2009	18489	1999	3407
2008	21331	1998	2512
2007	23111	1997	1971
2005	17902	1996	1480
		1995	1137

Figure 2 and Table 5 show that the number of applications in the U.S., the applications of E-Commerce business method patents started before 1995, much earlier than in China. The number of applications is already over 1,000 in 1995. The amount kept in explosive growth in 2001, with twice much more than in 1999. Although the annual applications decreased a little years later, but the amount still keep over 10,000 files. This is affected by the State Street Bank act in 1998. After this act, the USPTO accepted large number of business method patent files. After 2001, the amount achieved two peaks, namely in 2007 and 2012. The amount in 2008 and 2009 decreased a little, with the confluence of Bilski act.

In addition, Figure 2 also shows that, the amount of applications in the U.S. rose with fluctuations totally. The technology life cycle is still in growth stage. This is mainly because of the confluence of judicial precedents. Through these cases, we can see that, the American have been trying to find the most suitable examination system of the E-commerce business method patents, so that the method patents can be protected well with high efficiency and moderate management.

3.1.3 Summary

Based on the comparison, it can be concluded that , the patent protection of E-Commerce business method starts much earlier in the U.S. than in China. The development of E-commerce has a long historical standing in the U.S.; although the amount of applications in the U.S. is with fluctuation, the total number is higher than in China, with even over 20,000 files in individual years. It's obvious that the development of E-commerce related technologies have gaps between the two countries. But the technology life cycles are both in growth stage.

Although it starts late a little in China, it develops fast. The annual amount of applications in China rose stable in recent years, however, it increased unsteady in the U.S. With this trend, it has much possibility for China to be preminent above the U.S. provided that Chinese make great efforts.

3.2 Subject Analysis

3.2.1 In China

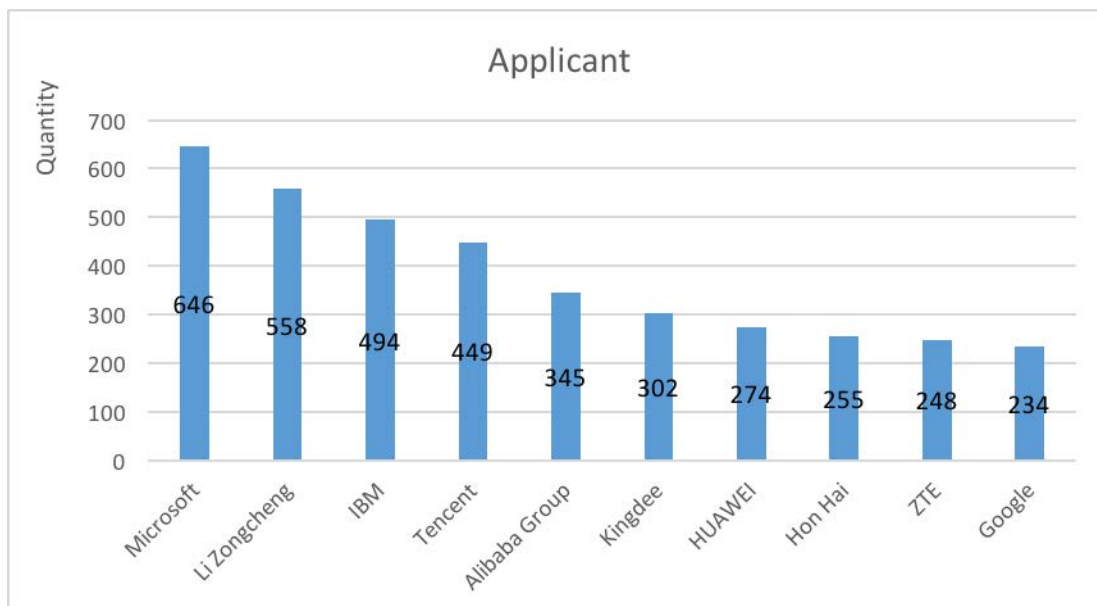


Figure 3 Applicants of E-Commerce business method patents in China

Figure 3 shows that among applications of business method patents, Microsoft with 646 patent filings has emerged as the top applicant with Li Zongcheng^[23] taking the second spot with 558 and IBM taking the third spot with 494. Among domestic Internet giants, the applications of Tencent is higher than ALIBABA. Kingdee is the famous financial software corporation in China, with 302 applications. But as giants of communication industry, HUAWEI with 274 and ZTE with 248 are a little backward.

It's obvious that, in Internet industry, large global enterprises, such as Microsoft, IBM, Google etc., attach much importance to Chinese market. They started early to arrange patent layout strategy and invested more on the R&D (research and development). These corporations are noteworthy to watch for domestic companies. In addition, Tencent, ALIBABA, HUAWEI are also in the top, which reflects that the domestic companies also have relative high IP consciousness. On the other hand, although these domestic companies keep a higher market share in the Internet Industry in China than American corporations, the patent protection of them started relative late and have loophole in patent layout with the comparison of American corporations.

3.2.2 In the U.S.

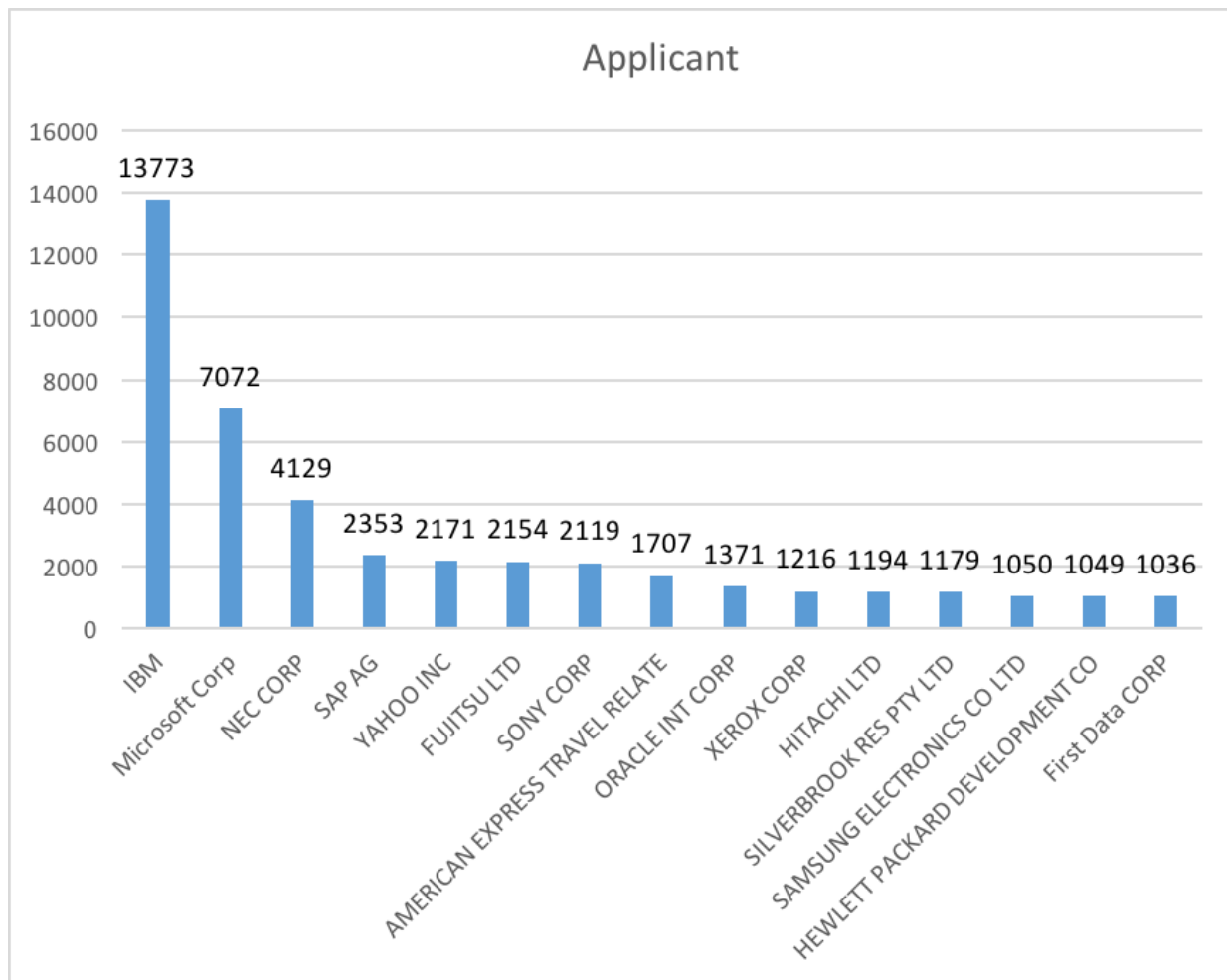


Figure 4 Applicants of E-Commerce business method patents in the U.S.

Figure 4 indicates that IBM with an absolute advantage, 13,773 files, stands the first position among applicants. Microsoft takes the second spot with 7,072 applications. The third spot is NEC Corp with over 4,000 files. There are relative quite great differences among the top 3. However, the Corp after the third one, whose total amount is much less than the amount of top 3, cannot contend against them. Most noteworthy is that, there are 8 Corps come from the U.S., the other famous two are from Japan. IBM, Microsoft and NEC, the top 3 Corps, are all from the U.S. The U.S. takes an absolute leading hole among the field of E-Commerce business method patents.

3.2.3 Summary

By contrasting Figure 3 and Figure 4, the author find that, IBM and Microsoft always occupy the top three whether in China or in the U.S. The absolute quantity of applications of top applicants in the U.S. patents is greater than the same position in China. The number of IBM in the U.S. patents is even more than the total amount of top 10 in China. There's a large gap between the U.S. and China.

3.3 Nation Analysis

3.3.1. In China

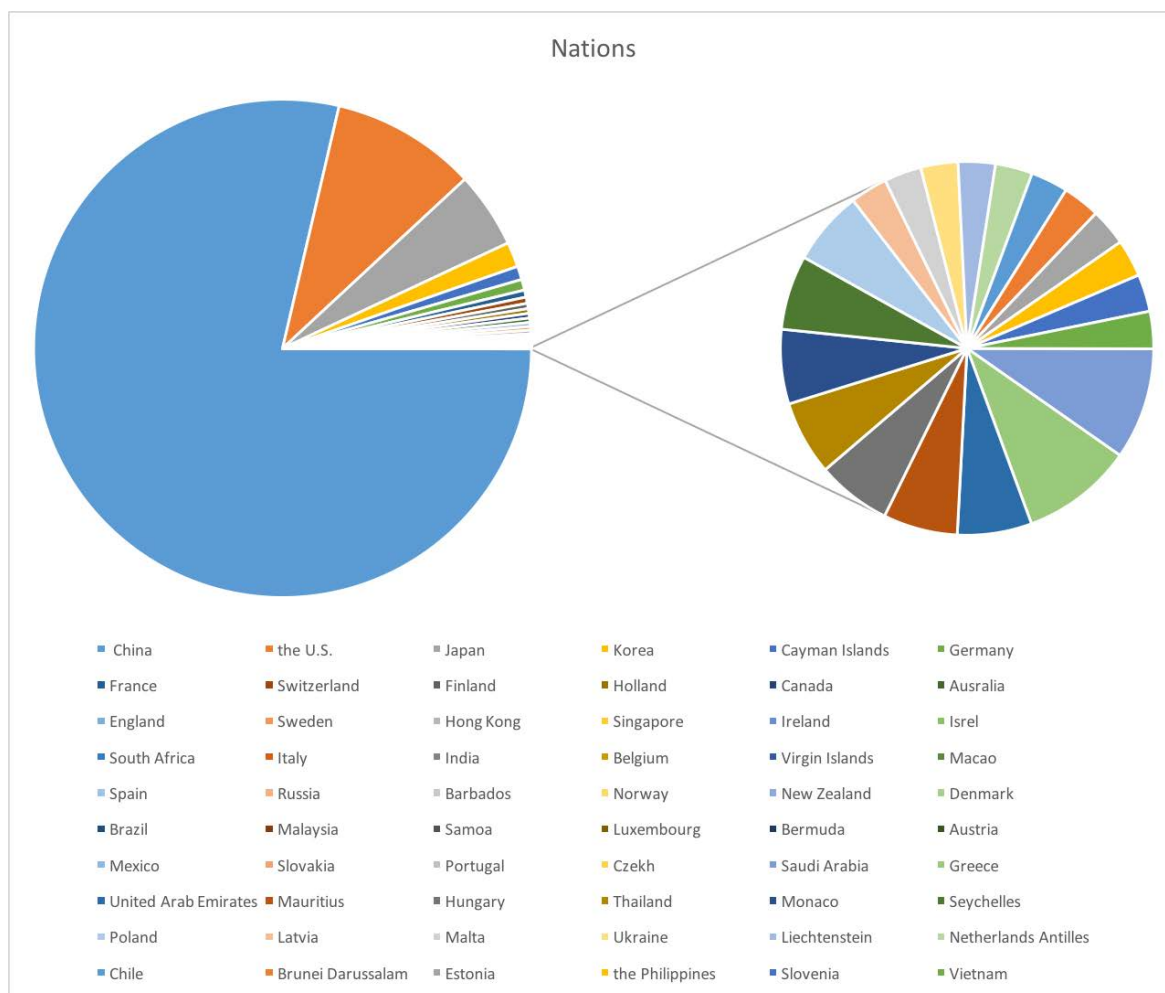


Figure 5 Pie Chart of Applicant Nations of E-Commerce Business Method Patents in China

Table 5 Applicant Nations of E-Commerce Business Method Patents in China

	Nation	Quantities (Pieces)	%
1	China	36120	78.62%
2	The U.S.	4338	9.44%
3	Japan	2271	4.94%
4	Korea	742	1.62%
5	Cayman	404	0.88%
6	Germany	322	0.70%
7	France	210	0.46%
8	Switzerland	186	0.40%
9	Finland	157	0.34%
10	Holland	142	0.31%

Figure 5 and Table 5 show the geographical distribution of the applications of patent in the field of E-Commerce business method patents in China. It can be observed that most of the applicants come from domestic area. Corps from China occupy about 80%, which means an absolute advantage in the applications of E-commerce business method patents. Apart from China, the U.S. and Japan also have many applicants, so has Korea. Corps from China are in great amount and have sustainable ability in the field of E-Commerce.

3.3.2. In the U.S.

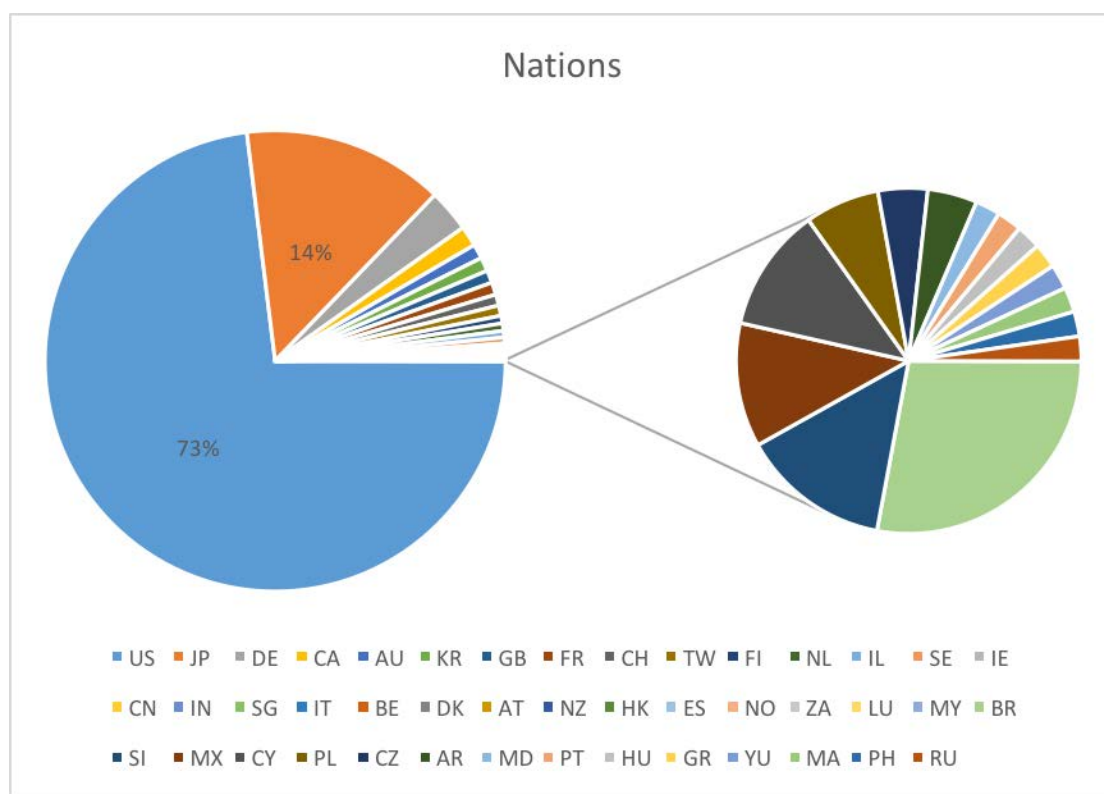


Figure 6 Pie Chart of Applicant Nations of E-Commerce Business Method Patents in the U.S.

As is indicated in Figure 6, among the top 20 of applicant in the U.S. Patent, American domestic companies occupy about 73% with an absolute advantage; companies from Japan with 14% occupation takes the second spot, which is the first position among foreign companies. Germany and Canada each only account for 3% and 1%. Taiwan takes the 10th spot and Mainland China is ranked 16th.

3.3.3. Summary

By contrast with two databases from China and the U.S., local enterprises in their own country have absolute advantages on quantity. Chinese enterprises need to keep on the top, continue to innovate, strive to improve patent transformation. However, combined the Figures in section 3.2, we can learn that, although Chinese enterprises have the top position of the absolute amount, the amount of applications of each American enterprise take a great role in this field. Most of the large global corporations are highly competitive with preliminary patent layout in Chinese market.

American enterprises develop and mature with high R&D strength. Japanese enterprises are also unwilling to lag behind and have places in both China and the U.S. It's obvious that the amount of applications from developed countries is much more than developing countries such as China. The overall strength level of developed countries is much higher than developing countries.

3.4 Thematic Analysis

International Patent Classification (IPC) provides for a hierarchical system of language independent symbols for the classification of patents and utility models according to the different areas of technology to which they pertain.^[24] Patent files can be found quickly when needed with the help of IPC.

On the basis of Intellectual Property Classification, the business method patents belong to a specific category----G06Q. The research object of the Paper, namely E-commerce business methods, concentrate mainly on G06Q10 and G06Q30.

G06Q : data processing systems or methods, specially adapted for administrative, commercial, financial,

managerial, supervisory or forecasting purposes; systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes, not otherwise provided for

Table 6 IPC Technical Field and Patent Quantities

IPC No.	Theme	Application quantities	Authorization quantities
10/00	Administration; Management	7255	501
20/00	Payment architectures, schemes or protocols	1364	171
30/00	Commerce, e.g. shopping or e-commerce	7741	492
40/00	Finance; Insurance; Tax strategies; Processing of corporate or income taxes	1807	92
50/00	Systems or methods specially adapted for a specific business sector, e.g. utilities or tourism	4658	346
90/00	Systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes, not involving significant data processing	566	105
99/00	Subject matter not provided for in other groups of this subclass	187	55

Source: IPC-2016.01 files and data^[25]

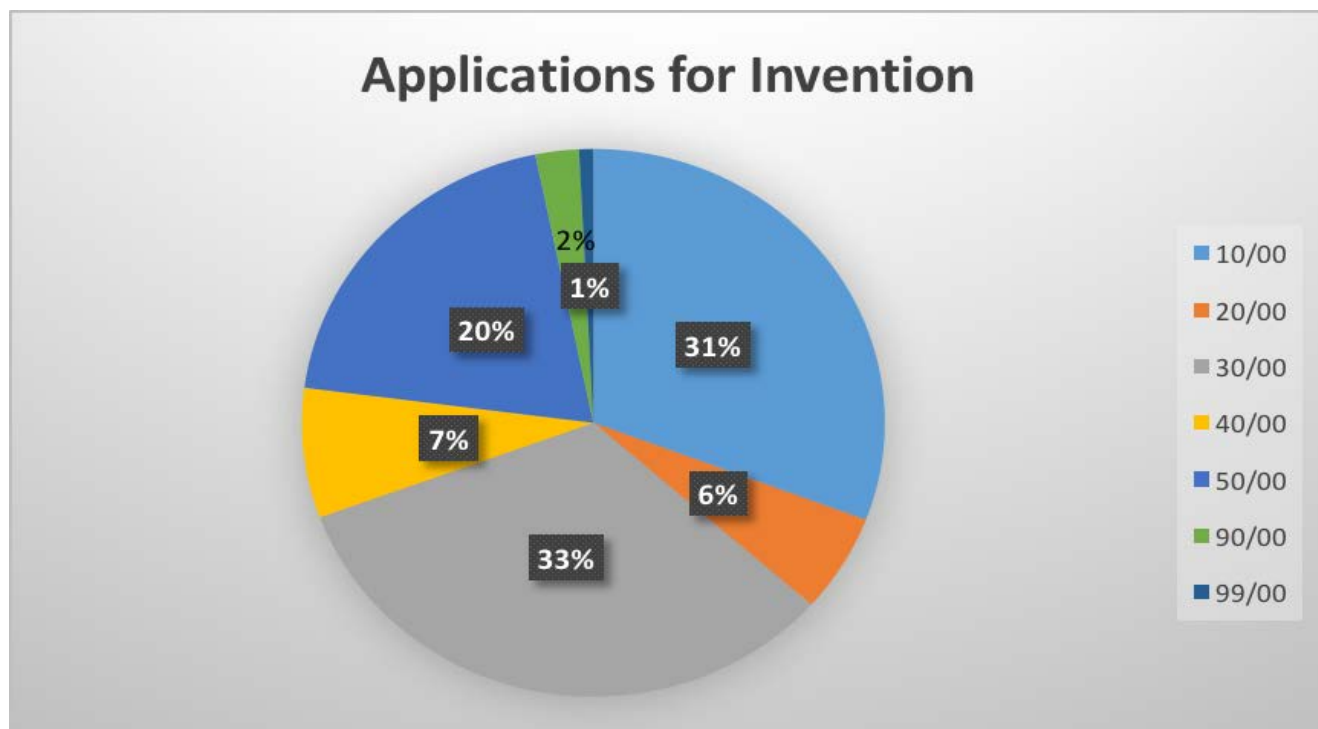


Figure 7 Pie Chart of the amount of patents in IPC Subclass

Table 7 Ranking of applicants in the subclass of 10/00&30/00

Rank	Applicant	Quantities (Pieces)	%
1	IBM	65	6.17%
2	Tencent	45	4.27%
3	SONY	28	2.66%
4	Panasonic	24	2.28%
5	HUAWEI	23	2.18%
6	ALIBABA Group	16	1.52%
7	Hitachi LTD	14	1.33%
8	FUJI XEROX	13	1.23%
9	Kingdee	11	1.04%
10	Canon	10	0.95%

Table 6 and Figure 7 depict that the number of applications and authorizations in G06Q field.

7255 applications were filed in 10/00 subclass; 7741 applications were filed in 30/00 subclass. These two subclasses occupy over 60%. The data shows that E-Commerce business method patents in China mainly concentrate on G06Q10/00 and G06Q30/00, namely the fields of administration, management and commerce. The enterprises have already arranged patent strategy in these fields. That means the future competition of E-commerce technology will focus here. Enterprises need to spend more on R&D in those fields.

From the view of rows in Table 6, the number of authorizations is too small with the average percentage of about 10%. Combined Table 7, we know that the foreign enterprises occupy more percentages among authorization patents. It's urgent to improve capability of independent innovation of domestic enterprises.

IV. Conclusion & Suggestions

From those data we can learn that the development trend of E-Commerce business method patents keeps overall well in China and has climbed steadily. However, from the view of the number of authorization patents, the patent quality still need to be improved. Only authorized patents can be the competitive weapons in the Internet industry after all. No other than improving technical innovation and technology transformation can develop the competitiveness of Chinese E-commerce.

In the subclass of G06Q10/00 and G06Q30/00, by the patent analysis and comparison with American enterprises, domestic enterprises need to improve technical independence. They need to pay more attention on the direction of innovation, improvement of the patent quality in the future R&D so that the competitiveness can be improved. The technology life cycle of E-commerce is still in growth stage, which means there's still much space for the future technology R&D.

With relatively complete patent layout, Americans started earlier than Chinese in this field. However, the E-commerce development in China climbed quite quickly. Chinese Internet enterprises need to invest more efforts to seek for the technical breakthrough. For the future development, they need to plan patent infringement ahead strategically to avoid conflicts with enterprises who control related patents, for fear that the financial loss. They should participate in the international competition actively, Enhance China's capacity for independent innovation and make China an innovative country.

Statement: All the data of Chinese patents come from Patent Search of SIPO (<http://www.pss-system.gov.cn/>); All the data of the U.S. Patents come from USPTO Patent Database (<http://www.uspto.gov/patents-application-process/>)

References

- [1] https://www.wto.org/english/thewto_e/minist_e/mc10_e/briefing_notes_e/brief_ecommerce_e.htm Date: Jan. 27,2016
- [2] "Ecommerce Sales Topped \$1 Trillion for First Time in 2012". eMarketer. Retrieved 28 Jan 2016
- [3] Gracie, C. (2014). Alibaba IPO: Chairman Ma's China - BBC News. [Online] BBC News. <http://www.bbc.com/news/world-asia-china-29119121> [Accessed 28 Jan. 2016]
- [4] http://www.sipo.gov.cn/mtjj/2014/201406/t20140625_970979.html Retrieved 15 Jan 2016
- [5] Citibank, Chinese Patent ZL92113147, 1992, authorization proclamation No. CN1096644C, authorization proclamation date: 18. Dec. 2002
- [6] Citibank co., LTD, Chinese Patent ZL96191072, 1996, authorization proclamation No. CN1097799C, authorization proclamation date: 1. Jan. 2003
- [7] Hotel Security Checking Co. V. Lorraine Co., 160 F. 467 (2d Cir. 1908)
- [8] Cai Buqing. Patentability of Business Methods From the Prospective of Certain American Leading Cases [J]. Journal of Henan University of Economics and Law,2012,05:154-163.
- [9] 333 U.S. 127 (1948)
- [10] Gottschalk v. Benson, 409 U.S. 63 (1972)
- [11] Parker v. Flook, 4347 U.S. 584 (1978)
- [12] Patentability Of Business Methods — A Global Comparison
- [13] Diamond v. Diehr, 450 U.S. 175 (1981)
- [14] Patentability Of Business Methods — A Global Comparison
- [15] Arrhythmia Research Technology Inc. v. Corazonix Corp., 958 F.2d 1053 (Fed. Cir. 1992)
- [16] In re Alappat, 33 F. 3d 1526 (Fed. Cir. 1994)
- [17] Patentability Of Business Methods — A Global Comparison
- [18] State Street Bank and Trust Company v Signature Financial Group, Inc., 149 F. 3d 1368 (Fed. Cir. 1998)
- [19] In re Bilski, 130 S.Ct. 3218 (2010).
- [20] In re Bilski, 130 S.Ct. 3218, 3230 citing Diehr, 450 U.S. at 188.
- [21] Zhu Shaoshan. Analysis of Advantages and Disadvantages on Protection of E-commerce Business Method Patent [J]. Social Sciences in Hubei, 2004,03:110-111.
- [22] http://www.sipo.gov.cn/mtjj/2014/201406/t20140625_970979.html retrieved 15 Jan 2016
- [23] Li Zongcheng, professor of Dongwu Business School, Soochow University. http://sxy.suda.edu.cn/DS_Detail.asp?ID=51 retrieved 31 Jan 2016
- [24] <http://www.wipo.int/accessibility/en/> retrieved 31 Jan 2016
- [25] <http://www.wipo.int/classifications/ipc/en/ITsupport/Version20160101/> retrieved 31 Jan 2016