

# The geographic concentration of China's e-business enterprises: where they gather and why

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**Abstract** The geographic concentration of China's e-business sector represents beyond the ordinary image. The study focused on its analyses on 446 China's e-business enterprises. The results show that a) Beijing, Guangdong, and Zhejiang are three emerging clusters whose enterprise dynamics have spread beyond the commonly mentioned major high-technology regions, and b) the regional economic status and ICT infrastructure condition are only necessary conditions of being a gathering centre, instead of sufficient conditions. Furthermore, China's e-business sector is mainly influenced by the capital effect, and its geographic concentration has impressive combination with the location, which depends not on local public sectors' deliberate efforts in doing-business promotions, but on the founders' social relationships.

**Keywords** China's e-business enterprise · Geographic concentration · Beijing capital effect founder

**JEL classification** R12 · R3

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## Introduction

It has been more than 20 years after China accessed the world-wide web. Based on the data from CNNIC (short for China Internet Network Information Center), as of June 30, 2015, the number of Internet users in China was 668 million, the Internet penetration rate was 48.8 %, and the number of mobile Internet users was 594 million, indicating that approximately 88.9 % of Chinese netizens used a mobile device. And specially, three of the 2015 global top 10 Internet companies by market value are located in China (see Appendix 1). Celebrating the 21th anniversary of China accession to the Internet, we could find that the Internet arrived in China in the year 1994 is a coincidental consequence of, and inevitable supporting tool for, the “socialist market economy”. The e-business sector in China now is the indispensable mean of economic and social activity, and Chinese governments wish it to ignite the enthusiasm of “mass entrepreneurship and mass innovation”. Undoubtedly, the emerging high-growth China's e-business sector deserves attention.

Owning to its great importance, the structure of e-business sector has been a subject of numerous studies. Over the last 20 years in the 20th century, much of the work has mainly focused on market structure, capital structure, or topological structure, and there is a noticeable oversight in previous studies—geographic structure. New generation development economics or new trade theory tell us that industries usually display geographic concentration, and explain why it occurs (Krugman 1991). Consequently, there have been increasing efforts over the past decades, mainly using the data of U.S. or OECD countries for empirical examination. Studies found that an increasing number of Internet businesses succeed at focusing on a specific geographic area, which were essentially the same as manufacturing industry (Zook 2002; Dumais et al. 2002; Grubestic et al. 2003; Forman et al. 2003; Shane 2004).

The aim of this study is to answer where China's e-business enterprises gather and why. Indeed, case study of China's e-business sector has its special significance, not only China's e-market has the huge potential and active innovator, but also there is little of general geographic description of it. Here we define China's e-business enterprise as independent business phenomena registering its domain name in mainland China, which arises in e-market that have three characteristics: a) there must be two or more distinct groups of customers, b) there must be some benefit from connecting or coordinating members of the distinct groups, and c) an intermediary can make each group better off through coordinating their demands (Evans and Schmalensee 2005). Meanwhile, e-business sector can generally be described as the typical multi-sided markets platform. The definition of "platform" is loose in this context, although the term has proliferated in corporate strategies and management practice. Different from the general platform theory (Eisenmann et al. 2008; Gawer and Cusumano 2014; Thomas et al. 2015), in this paper, the concern is not on the product family platform and organizational platform, but is on market intermediary platform and platform ecosystem, just like a metaphor, e-business sector could be regarded as Internet-based ecosystem. As for the relationship between platform and enterprise, sometimes, several platforms belong to one enterprise; sometimes, a platform and an enterprise correspond.

The remainder of this paper is arranged as follows: the "Hypothesis, data and method" section which describes the research design. The "Results" section presents our findings: the spatial concentration of China's e-business sector and its characteristic. The "Discussion" section analyzes factors influencing the concentration phenomena. The "Conclusions and Limitations" section summarizes and develops issues for future study.

## Hypothesis, data and method

### Brief literature review and hypothesis

Early study about geographic structure of e-business sector mainly focused on Internet content platform. Using a combination of domain names and user counts, Zook outlined the dynamics of Internet content production globally, and considered the actual production of Internet content depends upon certain cities (Zook 2001). Another study published at the same year, reached the same conclusion (Chyi and Sylvie 2001). Two sets of locational findings about U.S. were: a) there are several emerging Internet clusters whose enterprise dynamics have spread beyond the commonly mentioned major high-technology regions; and b) yet, the enterprise dynamics and operation of headquarters and branch offices take the form of a poly-centered regional cluster which expands

beyond the traditional notion of the city and suburb (GwangYa 2002). The empirical work about China demonstrated that being connected is a matter of geography, and e-business is not every regional economic advantage (Jun 2006).

Research by Zook showed that skilled labor is one of the key influencing factors, in particular, the founder of e-business enterprise (Zook 2008). Sinai and Waldfogel found out that the level of the Information infrastructure, especially the Internet penetration and the access rate of Internet influence the e-business sector clusters (Sinai and Waldfogel 2004). The research by Shane believed that since e-business enterprise do not need to rent large workshop and hire large amount of labor during start-up period, metropolis with high house prices and human cost will not lose its superiority (Shane 2004). Moreover, research by Jun showed that e-business enterprise in China gathers in developed region for the reason that the information infrastructure, skilled labor supply, and the capital market's maturity level are more suitable for development (Jun 2009).

Based on the previous available literature, and considered the accessibility of the data, hypotheses tested in this study are: a) gathering places of China's e-business enterprises spread beyond the commonly mentioned major high-technology regions, and it is a poly-centered regional cluster; and b) the factors that affect the cluster of Chinese e-business sector are the regional economic status and information infrastructure condition.

### Data set and analysis steps

There were several classical possibilities to characterize the agglomeration degree (Krugman 1991; Kim 1995; Audretsch and Feldman 1996; Kral and Michael 2001). Unluckily, the employment data of e-business sector needed to analysis are generally quite poor, because the national statistical classification system has not adjusted to suite to the information economy yet. Following the work of Combes and Overman (2004), we assumed that it shouldn't be acceptable for the purpose of estimation analysis once more than 20 % of the data were missing. So we adopted domain name statistical analysis according to the previous research (Zook 2001).

There is a one-to-one relationship between e-business enterprise and domain name. A better indicator for the location of e-business enterprise is the registration address for domain names, such asnytime.com or nokia.fi (Moss and Townsend 1997; Zook 2008). This study considered the domain name registration address to be the location of e-business enterprise. But there is no guarantee that the domain name registration address and the location of e-business enterprise must be the same place. Under Chinese law, getting a valid ICP License (short for Internet Content Provider License) is all websites' ticket to guaranteed online visibility in mainland China, or else it will be blocked. ICP License and the MIIT (short for Ministry of Industry and Information Technology of the People's Republic China) ICP/IP Address Information

Record Management System showed that there is a strong correlation between the domain name registration address and the physical location of e-business enterprise. Meanwhile, another analysis using the Nets database, owned by Alibaba Group, also illustrated the same result.

The statistical data used for analysis came from the CNNIC database (<http://www.cnidp.cn/>), which is the only source that provides comparable countrywide information about domain names. We selected all domain names meeting the above definition of China's e-business enterprise. The CNNIC database has opened up a wide variety of data for the public since 2012 and therefore we covered half year data for the period from January 2012 to June 2014. However, the domain name set constantly change, because the lifecycle of some domain names are short, as an inevitable consequence of the fierce competition in super-hot Internet market. Although registering a domain name has become relatively easy and inexpensive, it nevertheless represents a conscious decision to use the Internet in a more sophisticated manner (Marcone 2003), and to provide something to the rest of the world. In order to guarantee the consistency and integrity during our study window, we removed all variable domain names out of data set. Thus the quantity was 446, which were analysis samples.

We selected four indicators of each domain name to evaluate the popularity of e-business enterprise from the perspective of Internet user's behavior: a) daily unique visitors, b) total visits, c) total page views, and d) total visit durations. In this context, indicator a) represents distinct individuals requesting pages from domain name during 24 h, regardless of how often they visit. Indicator b) represents the total times of any domain name being visited every 30 min, no matter how many unique visitors make up those accesses. If anyone accesses any domain name many times within 30 min, it is marked as only one visit. Indicator c) represents the total number of pages which are visited on any domain name during the given time, and visit duration within 3 s is not included. Indicator d) represents the sum of duration that all visitors are on any domain name or a particular page within the domain name, and the time less than 3 s visiting per page is not included. Four indicators of 446 domain name have values respectively during the study windows.

We used GDP per capita, household consumption level, and regional financial revenue, which come from National Bureau of Statistics of the People's Republic of China (<http://www.stats.gov.cn/tjsj/>). We adopted regional Internet population penetration and IPv4 distribution to describe the regional popularity of information infrastructure, which also come from the CNNIC (<http://www.cnnic.cn/hlwfzyj/>).

The process of analysis involved the following steps:

- 1) Collect location information of each domain name by its valid ICP license. We took province (autonomous region,

municipality) as measurement unit. Data validation test was carried out by the Nets database.

- 2) Normalize four indicators by ratio respectively. Each domain name had four dimensionless numbers, which describe the popularity of each e-business enterprise. Four dimensionless numbers of each domain name are calculated as follows:

Daily unique visitors ratio = daily unique visitors of any domain name/daily unique visitors of all domain names marked by CNNIC

Total visits ratio = total visits of any domain name/total visits of all domain names marked by CNNIC

Total page views ratio = total page views of any domain name/total page views of all domain names marked by CNNIC

Total visit durations ratio = total visit durations of any domain name/total visit durations of all domain names marked by CNNIC

It needs to be mentioned that all domain names marked by CNNIC is 581, which is not equal to the sum of our analysis sample. Therefore, the sum of each dimensionless number is not equal to 1.

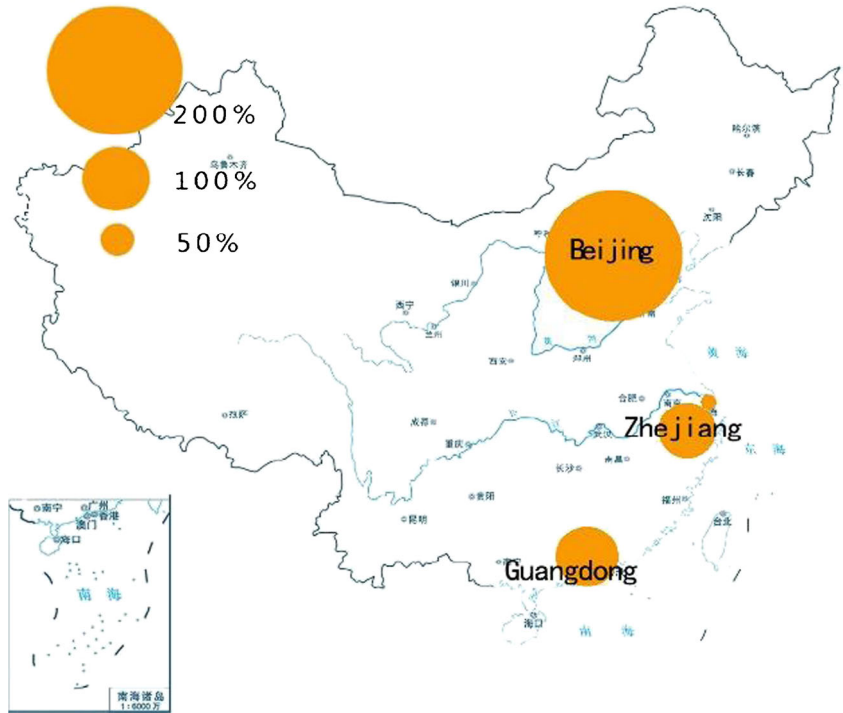
- 3) Draw four dimensionless numbers of 446 e-business enterprises respectively on the map of China. The pixel value of each dot was equal to each dimensionless number. Different e-business enterprise located in the same province (autonomous region, municipality) was superposed. Thus, we got four maps describing the geographic concentration of e-business enterprises in mainland China.
- 4) Apply correlation analysis between e-business enterprise agglomeration and the regional economic status. We tested the relationship between the four indicators and GDP per capita, household consumption level, and regional financial revenue.
- 5) Apply correlation analysis between e-business enterprise agglomeration and the regional information infrastructure condition. We tested the relationship between the four indicators and Internet population penetration, and IPv4 distribution.

We calculated five groups of half year data sets of each domain name separately, and results comparison showed that conclusion is logically consistent. To simplify, we showed the result from January 2014 to June 2014 in the following.

## Results

Figures 1, 2, 3, and 4 are visualization results of daily unique visitors ratio, total visits ratio, total page views

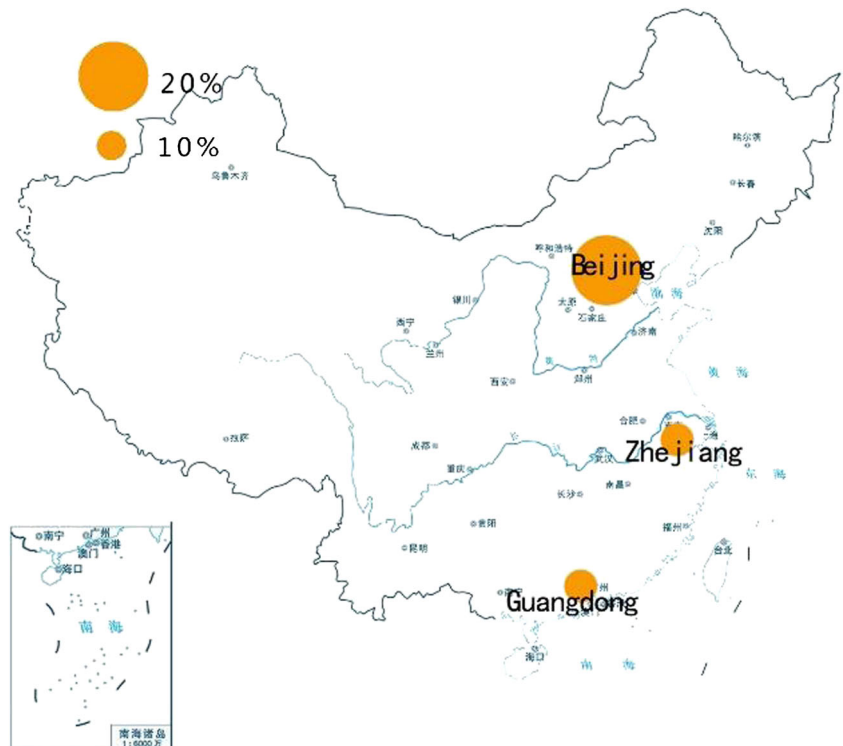
**Fig. 1** Daily unique visitors ratio map of China. Source: Own compilation based on CNNIC database



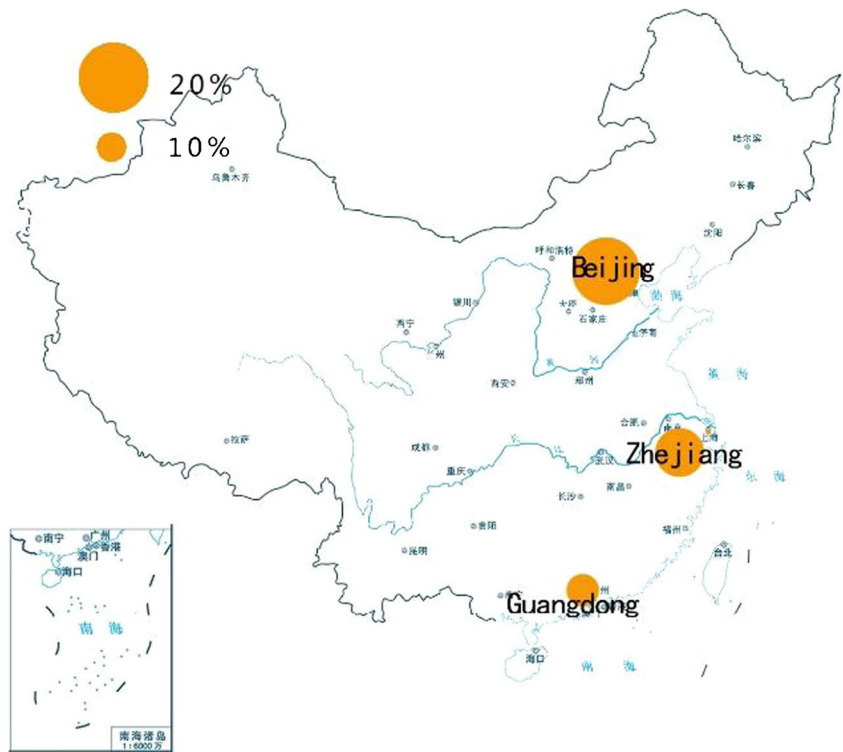
ratio and total visit durations ratio from January 2014 to June 2014. As shown in these figures, China’s e-business enterprises obviously concentrate in certain places. More detailed description of four dimensionless numbers of each province (autonomous region,

municipality) is in the Appendix 2. Beijing, Guangdong, and Zhejiang are three emerging Internet clusters, which mean the agglomeration of China’s e-business sector is poly-centered, and only Beijing is the commonly mentioned major high-technology region.

**Fig. 2** Total visits ratio map of China. Source: Own compilation based on CNNIC database



**Fig. 3** Total page views ratio map of China. Source: Own compilation based on CNNIC database

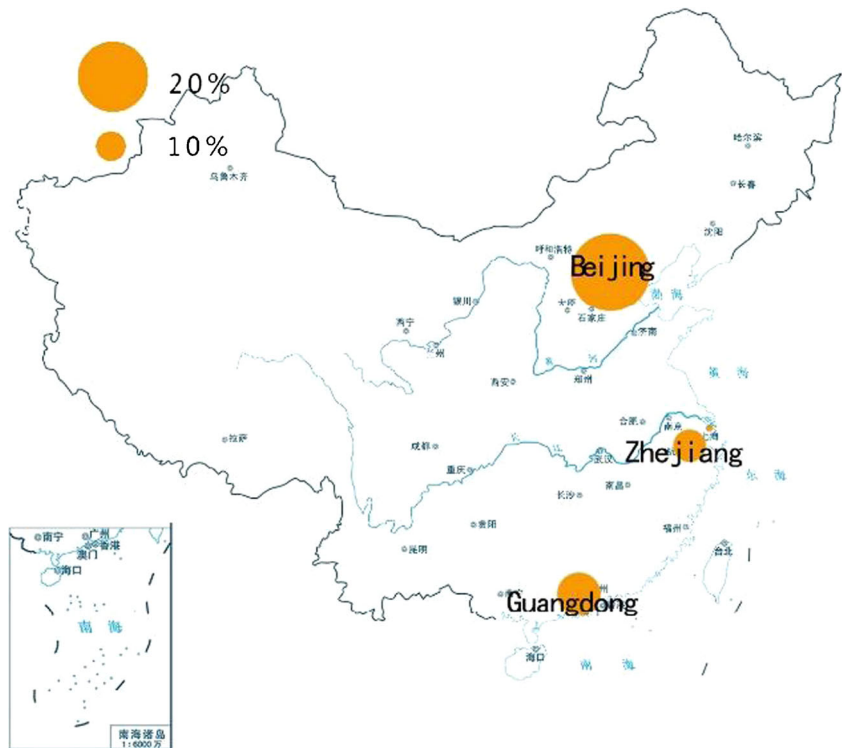


**Beijing: rising above the herd**

All indicators show that Beijing is clearly a gathering place of China's e-business companies (see Appendix 2). Beijing is a) 2.38 times higher than the second, Guangdong province, on

daily unique visitors ratio, b) 5.5 % higher than the second, Zhejiang province, on total page views ratio, c) nearly 13 % higher than the second, Guangdong province, on total visit durations ratio, and d) 7.5 % higher than the second, Zhejiang province, on total visits ratio.

**Fig. 4** Total visit durations ratio map of China. Source: Own compilation based on CNNIC database



**Table 1** Business area of Beijing's e-business companies

Business area	Frequency	Percentage
e-shopping	18	8.2 %
Others	15	6.8 %
Online gaming service	13	5.9 %
Online IT service	12	5.5 %
Search engine	11	5 %
Recruitment online	11	5 %
Group buy website	10	4.6 %
Women's fashion	10	4.6 %
Travel	10	4.6 %
Business to business	10	4.6 %
Automobile website	10	4.6 %
Information web portal	9	4.1 %
Online literature	9	4.1 %
Online financial service	9	4.1 %
Web video	9	4.1 %
Social networking site	6	2.7 %
Mainstream media	6	2.7 %
Digital document service	5	2.3 %
Online estate service	5	2.3 %
Online community	4	1.8 %
Online shopping and product sharing website	4	1.8 %
Music website	3	1.4 %
News website	3	1.4 %
Maternal website	3	1.4 %
Online payment	3	1.4 %
Sports website	2	0.9 %
Dating website	2	0.9 %
Website navigation	2	0.9 %
Blog service	2	0.9 %
Download station	1	0.5 %
Microblog service	1	0.5 %

Source: Own compilation based on CNNIC database

Two hundred nineteen out of 446 e-business enterprises concentrate in Beijing, which is accounted for 49.1 % (see Table 1). Beijing's e-business enterprises cover market maker, audience maker, and demand coordinator. For example, JD.com Inc. ([www.jd.com](http://www.jd.com)) is a typical market maker, which matches buyers with sellers. Each member of a group values the service more highly if there are more members of the other group, thereby increasing the likelihood of a match and reducing the time it takes to find an acceptable match. Baidu Inc. ([www.baidu.com](http://www.baidu.com)) is a typical audience maker, which matches advertisers to audiences. Advertisers value a service more if there are more members of an audience who react positively to their messages, and audiences value a service more if there is more useful "content" provided by audience-

makers. However, Internet content platform is strictly regulated in mainland China. Payment platform, such as YeePay.com is a typical demand coordinator, which sells different kinds of transaction services to merchants and account holders, and coordinates their demand to have a system that served either.

### Guangdong and Zhejiang: relying on internet giant

Four dimensionless numbers show that Guangdong and Zhejiang are on the same level, which are the second largest gathering centers of China's e-business enterprises.

As for the number of e-business enterprise, Zhejiang is slightly inferior, 40 less than Guangdong. On the level of city, 69 e-business enterprises of Guangdong mainly concentrate in Shenzhen and Guangzhou, and e-business enterprises of Zhejiang mainly gather in Hangzhou.

Unlike Beijing, Guangdong and Zhejiang rely on Internet giant: Tencent Holdings Ltd. and Alibaba Group. If we eliminate the e-business ecosystem which belong to Tencent Holdings Ltd. form all e-business enterprises of Guangdong, the four dimensionless numbers will decrease 3–4 times respectively. Likewise, if the organized e-business ecosystem of Alibaba Group is excluded from Zhejiang, the four dimensionless numbers will also decrease 3–5 times respectively.

Tencent Holdings Ltd. is almost audience maker, such as Wechat, music, video, but the online game, as a participating development family has ensured Tencent Holdings Ltd. become the biggest online game developers platform in China, and what belong to Alibaba Group are various, which contain market maker, such as Taobao, Alibaba, audience maker, such as Xiami music, and demand coordinator, such as China's PayPal—Alipay. These differences make Guangdong higher than Zhejiang on daily unique visitors ratio and total visit duration ratio, and when it turns to total visits ratio and total page views ratio, the result is opposite.

### Shanghai: facing an awkward situation

There is a mismatch between the number of Shanghai's e-business enterprises and the performance of four indicators. There are 65 among 446 e-business enterprises located in Shanghai, which is on the same level of Guangdong. However, no enterprise has the same market power as Tencent Holdings Ltd.. Moreover, four dimensionless numbers of Shanghai are so mediocre that cannot be marked in Figs. 1, 2, 3, and 4.

Compared with Guangdong, in Shanghai, daily unique visitors ratio is roughly 5 times lower, total visits ratio is more than 7 times lower, total visit duration ratio is about 7 times lower, and total page views ratio is around 7 times lower. Although there are 36 more e-business enterprises in Shanghai than those in Zhejiang, when it turns to four dimensionless numbers, Shanghai is 4 times lower on daily unique

**Table 2** Business area of Shanghai's e-business companies

Business area	Frequency	Proportion
e-shopping	12	18.5 %
Online gaming service	7	10.8 %
Online payment	6	9.2 %
Online financial service	5	7.7 %
Travel	5	7.7 %
Web video	4	6.2 %
Business to business	3	4.6 %
Social networking site	2	3.1 %
Online estate service	2	3.1 %
Others	2	3.1 %
Recruitment online	2	3.1 %
Online literature	2	3.1 %
Automobile website	2	3.1 %
Blog service	1	1.5 %
Website navigation	1	1.5 %
Online shopping and product sharing website	1	1.5 %
Women's fashion	1	1.5 %
Online IT service	1	1.5 %
Sports website	1	1.5 %
Download station	1	1.5 %
News website	1	1.5 %
Webmaster statistics	1	1.5 %
Mainstream media	1	1.5 %
Information web portal	1	1.5 %

Source: Own compilation based on CNNIC database

visitor coverage ratio, 10 times lower on total visits ratio, 5 times lower on total visit duration proportion, and 11 times lower on total page views ratio.

Like Beijing, e-business enterprises also cover market maker, audience maker, and demand coordinator in Shanghai (see Table 2). But both quantity and scale of each kind cannot be compared with those in Beijing. There haven't top 3 companies located in Shanghai of each business area. E-market is a winner-take-all market. So, Shanghai is not viewed as a gathering place of China's e-business enterprises though it is the commonly mentioned major high-technology region.

### Other regions: a general phenomenon of concentration in the provincial capital

The rest 64 e-business enterprises located in Jiangsu, Fujian, Hunan, Chongqing, Tianjin, Sichuan, Henan, Anhui, Hubei, Liaoning, Hainan, Guangxi, Hebei, Shandong and Jiangxi. However, the four dimensionless numbers of these provinces/municipalities are quite low. Except that Fujian's daily unique visitors ratio is 5.19 %, total visit durations ratio is 2.42 %, and

daily unique visitors ratio of Hainan and Jiangsu is 1.36 % and 1.05 % respectively, the numbers of other provinces are all lower than 1 %, most of them are around 0.1 %. But there is still concentration in these provinces, and the provincial capital is a hot place of e-business enterprises.

### China's e-business enterprises gathers in developed region, but developed region is not necessarily the gathering place

The result of correlation analysis shows that two sets of indicator have relatively strong correlations (see Table 3). Correlation analysis results only explain that the regional economic status is necessary condition of being a gathering center, instead of sufficient condition, which means China's e-business enterprises will not necessarily gather in developed areas, although it undoubtedly will not gather in underdeveloped areas. Some areas, such as Shanghai, Shandong, Jiangsu, and Tianjin, have always been recognized as developed areas in mainland China since the reform and opening up, but they are not gathering places of China's e-business sector according to our study based on four dimensionless numbers—daily unique visitors ratio, total visits ratio, total page views ratio, and total visit durations ratio. We consider that the regional economic status, which is just a threshold, will be statistically insignificant in the process of agglomeration after regional economic level rise at some certain point in mainland China. Unfortunately, we have no method yet to estimate what the point really is.

### The popularity of information infrastructure is necessary condition of being a gathering centre, instead of sufficient condition

The result of correlation analysis also shows that two sets of index have relatively strong correlations (see Table 4). Correlation analysis results only explain that the popularity of information infrastructure is necessary condition of being a gathering center, instead of sufficient condition. Based on the inter-provincial differences in the regional Internet population penetration across mainland China, there exist three groups after 20-year development. According to the data of CNNIC and ITU (short for International Telecommunication Union), the regional Internet population penetration of the best group is higher than the global average, which includes Beijing, Shanghai, Tianjin, Sinkiang, Qinghai, Shansi, Hebei, Liaoning, Fujian, and Guangdong. The regional Internet population penetration of the worst group is lower than the national average, which includes Tibet, Gansu, Sichuan, Guizhou, Yunnan, Guangxi, Hunan, Jiangxi, Anhui, and Henan. The middle group includes Inner Mongolia, Heilongjiang, Jilin, Shandong, Ningxia, Shensi, Hubei, and Chongqing. From the perspective of IPv4 distribution, Beijing accounts for over 25 % nationwide, Guangdong accounts for almost 10 %, Zhejiang, Shanghai,

**Table 3** Correlation analysis results

	1	2	3	4	5	6	7
1 GDP per capita	1						
2 Regional financial revenue	.589**	1					
3 Consumer price index	.906**	.653**	1				
4 Daily unique visitors ratio	.507**	.432*	.608**	1			
5 Total visits ratio	.489**	.447*	.591**	.958**	1		
6 Total page views ratio	.489**	.449*	.590**	.966**	.999**	1	
7 Total visit durations ratio	.497**	.475**	.602**	.992**	.958**	.966**	1

Source: Own compilation based on CNNIC database and Statistical Yearbook of each province (autonomous region, municipality)

\*Correlation is significant at the 0.05 level (2-tailed)

\*\*Correlation is significant at the 0.01 level (2-tailed)

Jiangsu, and Shandong, respectively, account for almost 5 %, and the rest provinces (autonomous regions, municipalities) are respectively just 1–3 %. But according to our study based on four dimensionless numbers—daily unique visitors ratio, total visits ratio, total page views ratio, and total visit durations ratio, Shanghai, Jiangsu, and Shandong are not gathering places, whose information infrastructure is comparatively popular. We think that the popularity of information infrastructure, as same as the regional economic status, is also a threshold in mainland China. In other words, China's e-business enterprises cannot gather in those places with poor information infrastructure, but region with good popularity of information infrastructure is not necessarily the gathering place.

Evidence explains that telecommunication BNI (short for Backbone Network Interconnection), NAP-IXP (short for Network Access Point-Internet Exchange Points) and LNI (short for Local Network Interconnection) can't ensure the e-business enterprises agglomeration in the key cities. Over the past 20 years after China accession onto Internet, one could often hear of the complaint from the local administrators that why there are absent of bigger Internet companies because of no BNI, NAP-IXP and LNI. In fact, there are three ways for Internet interconnection in Shanghai, Beijing and Guangzhou, and the total bandwidth has reached to 1999Gbps, among the amount, BNI reached to 1073Gbps (see Table 5). And then,

the national-level NAP-IXPs stationing at Chengdu, Wuhan, Xi'an, Shenyang, Nanjing, Chongqing, and Zhengzhou, in the end of 2015, the total bandwidth is forecasted to 1480 Gbps (see Table 6). In the NAP-IXPs' cities, except Beijing, there are no agglomerations of I e-business sector.

## Discussion

The above correlation analyses don't exactly tell us what really influence the gathering of e-business sector. However, textual analysis helps us to find some explanations.

### The nation's capital has excellent location advantage

The nation's capital has excellent location advantage for e-business enterprises, which is different from U.S. (Zook 2001, 2002, 2008). In the early cluster development, cities in U.S. (such as Atlanta, Austin, Denver, Miami, Phoenix, Seattle) with warm entrepreneurship climate may be are emerging e-business sector clusters whose enterprise dynamics have spread beyond the commonly mentioned major high-technology regions (i.e., Boston, Los Angeles, New York, and San Francisco), which means a) physical locations as transportation hubs and distribution nodes in regional and global settings; b) state and local public sectors'

**Table 4** Correlation analysis results

	1	2	3	4	5	6
1 Regional internet penetration	1					
2 Number of IPV4	.619**	1				
3 Daily unique visitors ratio	.640**	.943**	1			
4 Total visits ratio	.623**	.844**	.958**	1		
5 Total page views ratio	.625**	.857**	.966**	.999**	1	
6 Total visit durations ratio	.659**	.924**	.992**	.958**	.966**	1

Source: Own compilation based on CNNIC database

\*\*Correlation is significant at the 0.01 level (2-tailed)



**Table 5** BNI, NAP-IXPs, LNI, and total bandwidth of key cities in China

Key cities	BNI (Gbps)	NAP-IXPs (Gbps)	LNI (Gbps)	Total bandwidth (Gbps)
Beijing	413	86	499	859
Shanghai	345	76	421	601
Guangzhou	315	44	359	539

Source: China Telecom. Year 2014

deliberate efforts as a business supporter throughout the enterprise evolution, and c) management of physical space and regional infrastructure to capture the enterprises' expansion and labor relocation (GwangYa 2002). But in China, nation's capital is the unconditional e-business sector cluster, and the same situation occurs in other Asian countries. Such as Seoul is the gathering place of South Korea's e-business sector, and Tokyo is the gathering place of Japan's e-business sector (Jun 2009).

As China's capital, Beijing is the political center, the cultural center, the international exchange center, and the science and technology innovation center, which is the best choice for younger Chinese. Employment growth in the scientific research, education, culture, finance, and business service sector is high. More importantly, Zhongguancun Science and Technology Park, which is often referred to as "China's Silicon Valley", is geographically situated in Beijing. Zhongguancun Science and Technology Park is the most intensive scientific, education and talent resource base in China. It boasts almost 40 colleges and universities as Peking University and Tsinghua University, more than 200 national (municipal) scientific institutions such as the Chinese Academy of Sciences and the Chinese Academy of Engineering, 67 state-level laboratories, 27 national engineering research centers, 28 national engineering and technological research centers, 24 university science and technology parks and 29 overseas student pioneer parks. During the past two decades, it has gathered nearly 20,000 high and new-tech enterprise, represented by Baidu Inc. and JD.com Inc., and has formed a high and new-tech industrial cluster featuring electronic

**Table 6** The NAP-IXPs cities in China

Key cities	China Telecom to China Unicom (Gbps)	China Telecom to China Mobile (Gbps)	China Unicom to China Mobile (Gbps)	China Mobile to China Tietong (Gbps)
Chengdu	40	20	10	30
Wuhan	50	20	20	100
Xi'an	30	10	10	20
Shenyang	40	10	10	0
Nanjing	80	60	40	30
Chongqing	50	10	10	40
Zhengzhou	50	20	30	100

Source: China Telecom, China Mobile, China Unicom, and China Tietong. Year 2014

information, R&D and service. Meanwhile, a national science and technology financial innovation center is established that involves government and social funds, industrial and financial capital, and direct and indirect finances. All these attract e-business enterprises to situate in Beijing, because the China's e-business enterprises especially need active venture capital, private equity, and rich intellectual capital.

### Location of the founders' social relationships is an influencing factor

Findings in U.S. imply that public sector's effective regional integration of industrial strategies and physical planning has influenced the e-business enterprise clustering (GwangYa 2002; Bell et al. 2012). But in China, it is a matter of the founders, not a matter of public sectors, which means founders of e-business enterprises always select the city where their alma maters locate or where they receive their first job, which may help them to get more resources from the familiar social relationships to survive in the early business development, including abundant capital and Intelligence, and vigorous support of local government. The founders' years in these familiar cities have left them an instinctive understanding of local folkways, especially those unseen rules of how to low-cost access entrepreneurial resources.

The result of textual analysis proved a high degree of consistency. Over 70 % of the 446 samples are in line with this conclusion. Two cases among them illustrate this point. One case concerns Alibaba Group, Jack Ma, the lead founder of Alibaba Group, who holds a bachelor's degree in English from Hangzhou Teacher's Institute (currently known as Hangzhou Normal University). After graduation, he had been a lecturer at the Hangzhou Dianzi University until he established his own business. Hangzhou is the capital city of Zhejiang province, where Alibaba Group is registered. Another example is Tencent Holdings Ltd., Pony Ma, one of the founders of Tencent Holdings Ltd., who graduated from Shenzhen University. He began his career at China Motion Telecom, moving to Runxun Communications located in Shenzhen before he founded Tencent Holdings Ltd. Zhang Zhidong, another founder of Tencent Holdings Ltd., is a classmate of Pony Ma in Shenzhen University. Shenzhen is one of the four Special Economic Zones, where Tencent Holdings Ltd. is registered.

Although the emerging Internet giants in China have been successful, the founders almost met with the fire-sale in their early career. What contribution to the success could be

entrepreneur's initial strategy choices and the first mover advantage, and not be local public sectors' deliberate efforts as a business supporter throughout the enterprise evolution. Yes. Mr. Jack and Mr. Pony are the first generation of entrepreneur, who realized the Internet-based ecosystem and platform strategy, and then introduced them into business practice. In Mr. Jack's view, the e-business ecosystem is that: a) be sure to slug business competitors is the most foolish; b) if you imagine all enemies in your eyes outside, all the enemies you would encounter; c) don't bring hatred to compete, and hatred with certain failure; d) the enjoyable of market competition is like playing chess, if you lost, and then playing again fairly, but the player can't battle with each other; e) the leadership must have largeness of mind, with being wronged; f) the truly entrepreneur have no any enemy, who is invincible in the heart, world-beater. The motto of Mr. Pony is that the product economy enslaves human beings, but Internet economy frees people's mind.

## Conclusions and limitations

There is a locational embeddedness of China's e-business sector, just like traditional industries clusters, which provides empirical contribution to China Internet ecosystem and regional economic structural transformations. Our findings are: a) Beijing is undoubtedly a gathering place of e-business enterprises, which create a virtuous cycle to hold its leading market position; b) Guangdong and Zhejiang are also clusters, which means China's e-business sector takes the form of a poly-centered regional cluster, and has spread beyond the commonly mentioned major high-technology regions; and c) the regional economic status and information infrastructure condition are necessary condition of being a gathering center, instead of sufficient condition.

We describe a Chinese Internet ecosystem story, which focused on the general geographic agglomeration. Unlike U.S., China's e-business sector cluster is affected by the Capital Effect, and it also has impressive combination with the place, which is linked to the founders' social relationships, not depended on the metropolis business environment. Why Guangdong and Zhejiang become the gathering place of e-business sector could be the result of stochastic effect. If Mr. Jack and Pony selected another city, it could totally present another landscape. In other words, the urban business environment is not so good for the entrepreneurship.

The above findings may have some policy implications for governance of e-business sector. In March 2015, China's Premier Li Keqiang has introduced a new "Internet Plus" action agenda for China that will see the nation focus on domestic technology adoption in order to drive economic growth by integration of digital technologies with manufacturing and business. And then, a series of public policies has been released, including the cloud computing and implication, broadband

connecting plan and lowering the Internet traffics, and big data strategy and action agenda. Premier Li also mentioned the policy goals of fostering e-business enterprise to increase their presence in the international market, accelerating fiber optic network construction, improving broadband speed, and promoting ITC-related goods and service consumption. So improving information infrastructure condition becomes the inescapable responsibility of local government. But better infrastructure is only the necessary condition of driving e-business sector growth. The priority agenda for enhancing the e-business sector is to offer more convenience to encourage young people, especially those gifted children from poor families, to start their own business. Better business climate, including dismantling all the restrictions, forming loose public policy, has great potential to contribute to foster more e-business entrepreneurs.

Limitations of this study mainly are: 1) four indicators of each domain name describing status of e-business enterprise are identified mainly by industry practice and data limitations, which need to theoretically make a thorough test of its rationality, and the same situation occurs in indicators describing regional economic status and ICT infrastructure condition; 2) besides the correlation analysis, regression method could be applied to test the relationship between the agglomeration of e-business enterprises and influencing factors; and 3) two influencing factors of capital city effect, location of the founder's social relationships are proved by textual analysis, which is limited by availability of material, even though we collect all public books, papers, and reports as we can, and observed trends in media may not be an accurate reflection of reality. Future studies should consider addressing the above issues when more data become available. Meanwhile, further studies would choose city as the analysis unit, as if the Internet traffic is available, and mating the consilience with local development level, it could bring the new findings and give us the deepening implication. Other factors, including institutional embeddedness (Saskia 2005), capital dependence, cultural awareness and entrepreneurship will be observed in future studies. Finally, facing the China's Internet Plus action agenda, which would be sure that it is impossible to foster the agglomeration of e-business companies at the desired areas, the imperative is to improve the official statistics for Internet industry, and with the complementary business survey, online questionnaires and executive interviews, which are especially helpful to empirical research on Internet industrial agglomeration in China.

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## Appendix 1

**Table 7** Three of the 2015 global top 10 Internet companies in China

Company	Rank	Market value (\$B)	Location province	Foundation time founder	IPO year (Location)
Alibaba Group	3	233	Zhejiang	1999, Jack Ma	2007 (HK) 2014 (U.S.)
Tencent Holdings Ltd.	6	190	Guangdong	1998, Pony Ma	2004 (HK)
Baidu Inc.	8	72	Beijing	2000, Robin Li	2005 (U.S.)

Source: Internet trends 2015—code conference by Mary Meeker

## Appendix 2

**Table 8** Calculated data results summary

	The number of e-business enterprises	Daily unique visitors ratio	Total visits ratio	Total visit durations ratio	Total visits ratio
Beijing	219	212.94	25.64	29.01	25.22
Guangdong	69	89.51	12.47	16.52	12.33
Shanghai	65	19.6	1.9	2.3	1.63
Zhejiang	29	82.66	20.16	12.18	18.64
Jiangsu	15	1.05	0.08	0.1	0.12
Fujian	11	5.19	0.57	2.42	0.64
Hunan	6	0.22	0	0.01	0.01
Chongqing	5	0.88	0.03	0.04	0.03
Tianjin	5	0.15	0	0	0
Sichuan	5	0.08	0	0	0
Henan	4	0.42	0.04	0.03	0.03
Anhui	3	0.33	0.01	0.01	0.01
Hubei	3	0.31	0.02	0.02	0.02
Liaoning	2	0.06	0	0	0
Hainan	1	1.36	0.1	0.17	0.09
Guangxi	1	0.42	0.02	0.11	0.02
Hebei	1	0.15	0.02	0.01	0.02
Shandong	1	0.07	0	0	0.01
Jiangxi	1	0.01	0	0	0

Source: Own compilation based on CNNIC database

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