

TEN YEARS OF INTERNET IN CHINA: A META ANALYSIS

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ABSTRACT

This study conducted a meta analysis of twenty semi-annual reports of China’s Internet development status by CNNIC. It examined the reports from four aspects: determining factors of the development level of Internet applications, regional differences in China in Internet applications, Internet user behaviors, and the current status of governmental and NGO domains/websites. Several interesting findings of the determining factors were obtained, and observations made about the Chinese Netters’ Internet usage patterns and their opinions. Significant regional differences were noted. There was also a healthy start for e-government and “e-civil-society” as reflected by the growth of governmental and NGO domains and websites.

Keywords: China, Internet, Internet applications, cultural issues, digital divide

INTRODUCTION

On December 31, 2007, the number of China’s Internet users reached a new record of 210 million (CNNIC, 2008), a historic record in this country of 1.3 billion population. China has been enjoying fast economic growth in the past two decades, and the arrival of the Internet Age is adding fuel to the locomotive of China’s economy. Millions of Chinese Internet users participate in online communications, online purchase, online sales (including auctions), as well as online personal publishing (personal home pages, blogs, etc). A good understanding of China’s Internet users is critical in order to tap into the market potential of the country’s 210 million Internet users.

Beginning from November 1997, China Internet Network Information Center (CNNIC) conducted semi-annual surveys of China’s Internet users, user behaviors, Internet infrastructure, and new trends regarding the Internet and various Internet applications. The surveys were conducted in June and December each year (except the first survey which was conducted in November 1997). We collected and “cleaned” data from the existing CNNIC reports (from the second to the twenty-first survey), and conducted a secondary data analysis. We intended to gain understandings of China’s Internet users as well as their opinions, behaviors, and online activities. We anticipated obtaining findings in the following aspects:

- regional contrast of Internet development and application status in China;
- trends, patterns, and relationships of China’s Internet applications and their determining factors;
- major behavioral patterns of Chinese Internet users.

DATA AND METHODOLOGY

The study is based on twenty semi-annual reports published by the CNNIC (excluding the first report which was not done in the “regular” time as all the other reports). The CNNIC reports are entitled “The Statistical Reports on the Development Status of China’s Inter-Networks.” The CNNIC regularly collected the number of connected computers, the number of Internet users and their demographics, the geographical distribution of these users, and the domain registration information, as well as information about websites operating from China. The reports also published demographical information of China’s Internet users, their usage of the Internet, and their opinions regarding “hot issues” of Internet applications. The CNNIC reports are written in Chinese. All the reports (except the first report) were used for the current study.

In this study, we focused our attention on the following issues and aspects:

1. The major determining factors of the development level of Internet applications as measured by the percentage of Internet users in the population of a given administrative region (province and provincial-level administrative regions);
2. the regional differences in China in terms of Internet applications, and the trend or dynamics of the regional differences;
3. Internet user behaviors, as represented by the most conducted online activities, and their changes;

DATA ANALYSES AND RESULTS

Determining Factors of the Development Level of Internet Applications

Bui, Sankaran and Sebastian (2003) proposed and tested a metric of eight factors with 52 measures for the readiness of e-commerce for a country. These factors are: Knowledgeable Citizens, Access to Skilled Workforce, Macro Economy, Digital Infrastructure, Industry Competitiveness, Culture, Ability, Willingness to Invest, and Cost of Living and Pricing. While those factors may be suitable for comparison across countries for their e-commerce readiness, when examining regions inside a country, some factors became not so relevant. Zhang and coauthors (Zhang et al, 2006) proposed a simplified model in the measurement of e-government readiness. They found that the development of e-government in a given region (city or county) within a country was related to the GDP per capita of the region of interest, and the percentage of college enrollment against the total population in the same region.

The Internet is, after all, an application of information and communications technology (ICT), and ICT relies heavily on the information technology infrastructure. An important measure of the infrastructure for the Internet is the ratio of telephone lines to the population in a given region (city/county/province). Therefore, we employed the measure of “number of phone lines per person” for this purpose. An advantage of this measure is that it can be calculated from the annual census reports of Chinese governments at the central and provincial level, via the items of “number of telephone lines (distinct phone numbers)” and “population of the region.”

The Internet’s power lies in its strong capabilities for individuals to search and access virtually unlimited information that are made available to the public. The Internet is but a bridge and/or “pipeline,” and there needs to be sources of information flowing through the pipelines.

Information is generated by certain activities by people, especially specific groups of people – the “knowledge workers” (Jessup and Valacich, 2008). The types of activities that generate information are typically classified in the “tertiary industry.” The development level of tertiary industry largely determines the amount and the value of available information. Hence, we used the percentage of the tertiary industry in the GDP of a given region (city, county, province) as the measurement of the level of information production and consumption.

We obtained GDP per capita in all the provincial-level regions in China from *China Statistical Yearbook* at China State Bureau of Statistics’ website (China State Bureau of Statistics, 2006). We obtained the enrolled college students per 100,000 populations in the corresponding regions, also from the same website. The *Yearbook* also provided number of phone lines in each of the thirty-one Chinese provinces/autonomous regions and directly-administered cities (such as Beijing and Shanghai). We divided the number of phone lines by the population of each province/region to obtain the “phone line per capita” data. The percentage of tertiary industry in the local GDP was directly provided in the *Yearbook*.

We ran correlation analysis of the percentage of netters in the total population in each province, with the factors of GDP per capita, proportion of enrolled college students, percentage of tertiary industry in the GDP, and the number of phone lines per capita, all of the same region for the thirty-one provinces (including autonomous regions and directly-administered cities). The correlation coefficients are as follows:

Table 1: Correlation Coefficients among Possible Factors of Internet Usage

		%Tertiary industry	Phone lines per capita	GDP per capita	College enroll per 100K people
%Netters in population	Pearson Correlation	0.554	0.924	0.956	0.859
	Sig. (2-tailed)	0.001	0.000	0.000	0.000

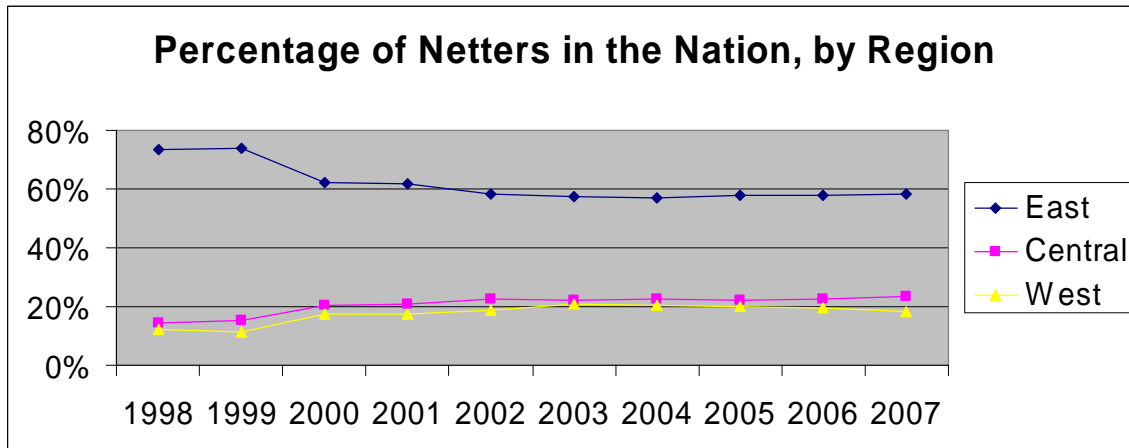
From Table 1 we can see that all the four factors – GDP per capita of the region, enrolled college students per 100,000 residents of the region, number of phone lines per capita in the region, and the percentage of tertiary industry GDP in the total GDP for the region – have significant correlation coefficients (all at the 0.01 level) with the percentage of Netters in the total population of the region. The above correlation coefficients agree with our assumption that the percentage of Netters in the population of a region is related to the four factors indicating the overall economic development, the relative development level of the tertiary industry, the development level of the information and communications infrastructure, and the development level of higher education in the region.

The Regional Differences

China is a vast country with very different climate, terrain, economic development levels, and even subcultures. It is logical for one to see very different levels of development of the Internet applications, as well as different levels of usage and expertise of using the Internet by people in various regions. China is generally divided into three distinct geographical and economic-development regions: the most developed east, the most backward west, and the central region that's in between.

We obtained the data of the numbers of Internet users in thirty-one provinces/autonomous regions/directly-administered cities in China from the CNNIC reports, and then the population data from the State Bureau of Statistics' website. We then aggregated the total number of Netters and total populations for each of the three regions (east, central, west), and calculated the percentage of Netters in their respective regions. The following are the results:

Figure 1: Percentage of Netters in the Nation, by Region



From Figure 1, we can see that from 1998 which is almost the beginning of the CNNIC reports until 2007, which has a time span of ten years, the percentage of Netters in a region (east, west, central) as against the national total stays largely the same for each of the three regions, with the East having nearly 60% of the country's Internet users, while the West and the Central regions each has only about 20% of the country's Netters. This clearly indicates a digital divide that doesn't show a sign of narrowing. From another angle, we calculated the percentage of Netters in their own regional populations (east, west, and central), and it is quite clear that while the East has a fast-increasing percentage of netters in its population (from less than 1% to nearly 25%), the rise in the other two regions are far less impressive (from less than 1% to about 10%), which clearly leads to a widening gap between the East and the other two regions.

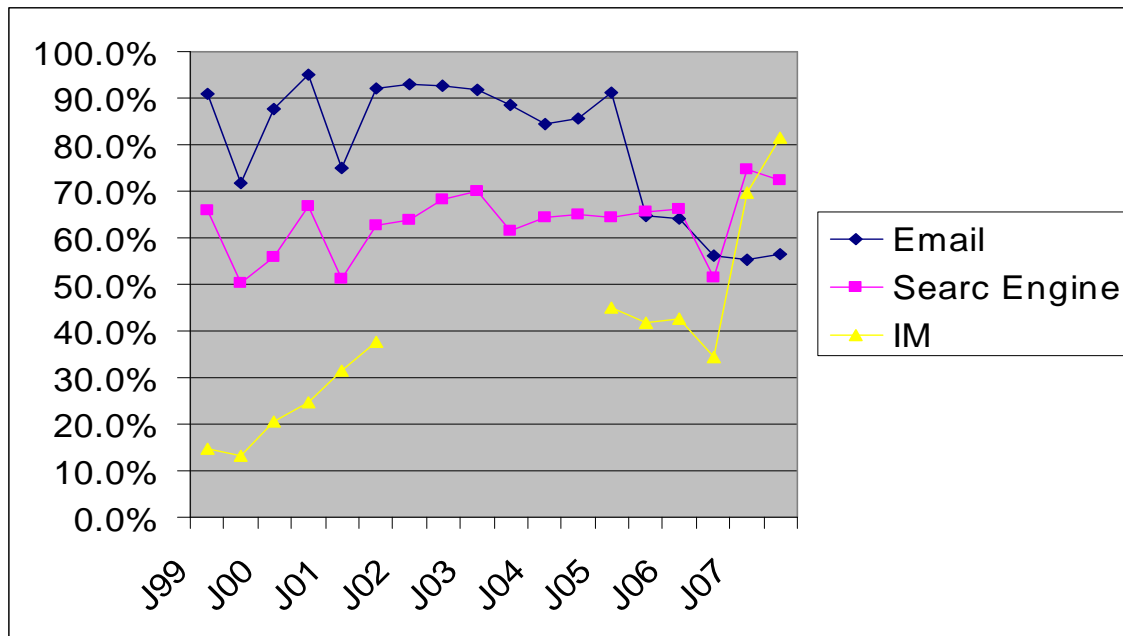
Internet User Behaviors

Understanding the behavioral patterns of the Internet users will help businesses to more effectively provide services to the Netters, and to develop new services and/or deliver services in new and better ways to the Netters.

From the CNNIC reports (summarized in Figures 2), it is interesting to see the following:

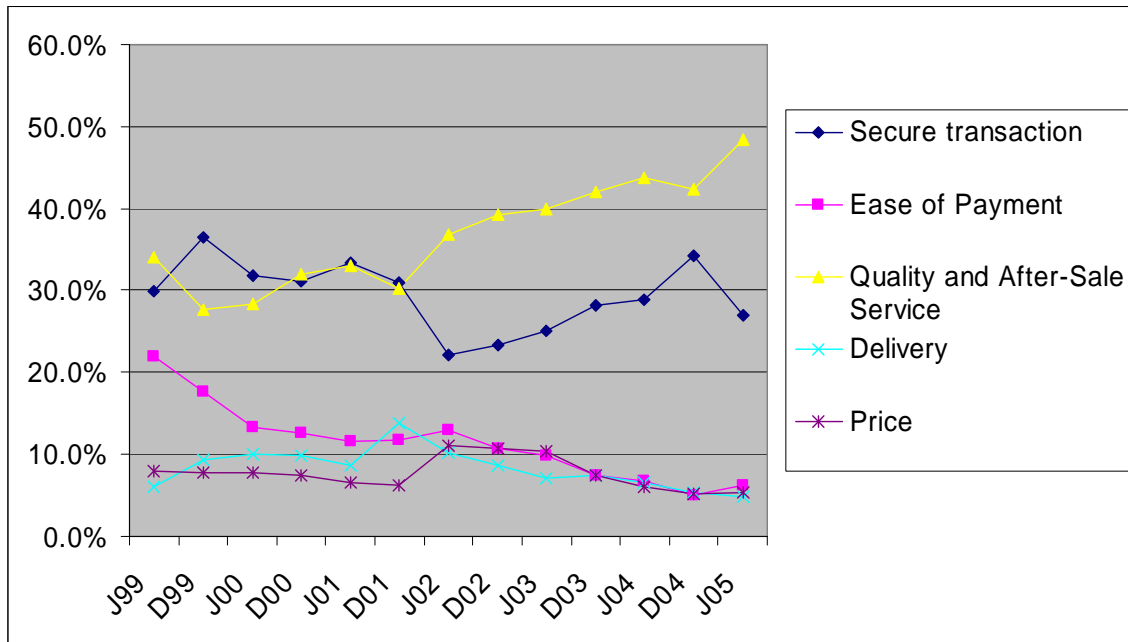
1. the Chinese netters use search engine function significantly less than email function, but that trend is turning around in the recent couple of years (Figure 2);
2. their use of instant messaging (IM) was fairly steady on the rise, and eventually rose to a level that is more than twenty percentage points higher than the frequency of email usage, which is quite unique compared to the behavioral patterns of Netters in the US who use email more than IM (the broken period is due to the change of reporting method/metrics of CNNIC) (Figure 2);
3. email usage had a sharp decline in 2005-06, while about the same time (a bit later) there is seen a sharp increase (nearly fifty percentage point) of IM usage (Figure 2);

Figure 2: Comparison of the Use of Email, Search Engine, and IM



The CNNIC asked the Chinese Netters their opinions regarding the barriers of e-commerce (here specifically “buying on line”). On this matter, the security of the transactions, the ease of payment (or lack of so), the quality of products and services, and after-sales service (such as repair and return), and on-time delivery have been the major concerns. The Chinese Netters also would like to see more attractive prices in online purchases. It is interesting to note that while concerns on security of transaction were somewhat alleviated by the development and maturity of such payment methods as PayPal and its Chinese counterpart of ZhiFuBao (“payment treasure” or “a gem for payment”), the worries about quality of products and services and after-sales service have been on the rise. One should note that that issue of trustworthiness of merchants is indeed one that has long bothered the Chinese consumers, on line or off line. In a lighter (and brighter) note, ease of payment seems to be continually improving, and has reached a level that’s close to trivial, nearly negligible (Figure 3).

Figure 3: Major Concerns of Buying Online



It is noteworthy that the Chinese Netters' concern over on-time delivery is also steadily declining since 2001-02, probably thanks to the development of delivery channels, and reached a low level of less than 5%, which signals the maturity of the delivery services for online purchase in China (Figure 3).

DISCUSSIONS AND CONCLUSION

This study conducted a meta analysis of twenty semi-annual reports of China's Internet development status by CNNIC. It was found that the development and application level of the Internet in a region is influenced by the overall economic development level of the region, and by the development level of higher education in the region. Significant regional differences in Internet application levels were noted, which should alert decision makers about digital divide among different geographical regions in China. The Chinese netters used search engines much less than email function, but that situation is changing recently, possibly with better search engine services as well as netters' sophistication in using search engines. The Chinese netters use IM heavily, which was also observed by the third author during his teaching in one of leading Chinese university in spring 2008. In contrast, a person from outside China might find that his/her emails were often not promptly replied by his/her Chinese correspondents. There might be an "instant culture" that prefers synchronous communications to asynchronous ones, which is worth further probe. In terms of barriers to e-commerce, the Chinese netters concern the quality and after-sales service the most, which is followed by the concerns over secure transaction. Efforts should be made to address those concerns so as to push forward e-commerce in China.

(References are available upon request from the third author)