

## **China's Government Expenditures, Policies, and Promotion of the ICT Industry**

**Dr. Shahram Amiri**

Associate Professor

Department of Decision and Information Sciences

Stetson University

Deland Florida 32723, USA.

**Shawnrece D. Campbell**

Associate Professor of English

Stetson University

Deland Florida 32723, USA.

**Yuwen Ruan**

Graduate Programs

Stetson University

Deland Florida 32723, USA.

### **Abstract**

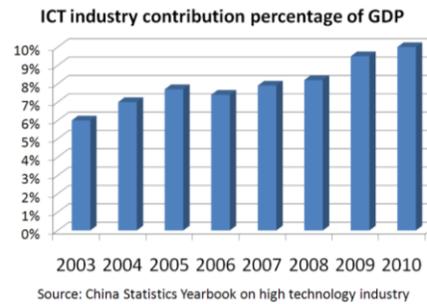
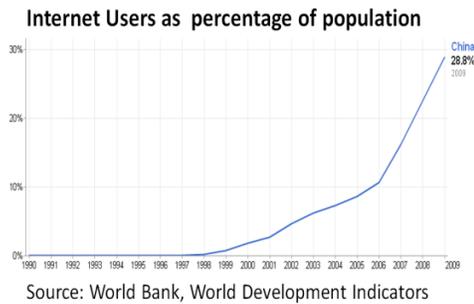
*China's information and communications technology (ICT) industry is enormous and complex, covering a broad range of sub-sectors. Previous research conducted by Heshmati and Yang (2006) found that ICT accounted for up to 20% of China's GDP growth from 1980-2001. They suggested that future research should analyze sub-sectors of China's ICT industry to understand how each sub-sector individually contributed to China's economic growth and to understand the policy options that affected each sub-sector. This paper examines if China's government expenditures and policies for the high-tech industry and the information communication industry are the main driving force behind the booming success of those industries. We use correlation and regression analysis to determine if China's government expenditures have reaped economic benefits through providing significant financial aid to the development of the high-tech industry in China and non-empirical data to determine if government expenditures and policies have aided the information communication industry. The empirical and non-empirical data results suggest that China's government did not rely on traditional strategies, such as increasing government expenditures, to promote its ICT industry but employed various types of strategic methods to support the development of the industry. China's government expenditures have not significantly aided the development of the high technology industry, but their policies have aided the information communication industry as is evident by this sub-sector's 10% contribution to China's GDP in 2010. The results will help us to understand which force(s) most impact the development of the ICT industry in China.*

**Keywords:** ICT, GDP, Economic Growth, China

### **1. 0 Introduction**

Over the last decade, China's ICT industry has been an engine of the country's economic growth – growing two to three times faster than GDP (PTL Group, 2009, n.p.). “Exports of ICT/Electronic products from China in 2007 reached USD\$459.5 billion, accounting for 37.7% of the country's exports. Overall revenues of ICT/Electronic products in 2007 increased by 18%, with computer manufacturing, communications equipment manufacturing and electronic components accounting for over 61.4% of revenues”PTL Group (2009, n.p.). China's information and communications technology (ICT) industry and its sub-sectors are enormous and complex and continued growth of the industry is expected. However, according to the PTL Group market analysis, “the regulatory framework of the ICT sector is complicated in China. The major watchdog is the Ministry of Industry and Information Technology (MIIT).

Other government authorities involved in the ICT sector, depending upon the sub-sector, could include Ministry of Science & Technology (MOST), Ministry of Public Security (MPS), General Administration of Press and Publication (GAPP), and State Administration of Radio, Film and Television (SARFT)” (2009,n.p.).



The development of the high-tech industry is prominently featured in China's 10<sup>th</sup> Five-Year Plan and the development of the information industry is prominently featured in China's 11<sup>th</sup> Five-Year Plan. Although China's ICT industry has been an engine of the country's economic growth for the last ten years, very few detailed analyses of China's government policies have been performed and very little empirical research has been conducted on China's economy due to a lack of data availability. Heshmati and Yang (2006) began addressing the deficiency in empirical research in their paper on China's ICT contributions to Chinese economic growth. They provided empirical evidence that China's overall ICT industry has significantly contributed to economic growth in China. They rejected the productivity growth paradox hypothesis which suggests that ICT has no significant economic benefit in developing countries. However, they acknowledge that ICT economic contribution is more evident in the 1990s than it is in the 1980s. Based on their calculations, ICT accounted for up to 20% of GDP growth and for about 38% of TFP (Total Factor Productivity) Growth.

Before Heshmati and Yang (2006) examined the contributions of ICT to Chinese GDP, Meng and Li (2002) conducted research on China's ICT industrial development and diffusion. They concluded that China's astonishing ICT development growth rate showed much promise for improving the country's economy. However, they did note that a digital divide among the nation's three economic regions including East, West and Central could hinder China's ICT development. Unlike Heshmati and Yang, Meng and Li did not use a specific methodological analysis in their research. These are the only studies we were able to find that were relevant to the focus of our paper and that used Chinese data as the basis of the research focus.

This paper makes a contribution to the growing literature on the impacts of ICT on economic growth by examining the relationship between China's government policies and their ability to aid the contribution of the ICT industry to GDP. It goes beyond the work of Heshmati and Yang by not only proving through quantitative analysis the contribution of ICT to Chinese economic growth but also examining what role Chinese government policies play in this industry's ability to contribute to the GDP. We provide empirical and non-empirical evidence that show although the ICT industry has made increasingly significant contributions to China's GDP, traditional government policies, such as increasing government expenditures, are not the driving force behind the industry's success. First, we investigate the relationship between China's government policies and ICT industry development in China. The contribution of ICT to economic growth was previously examined by Heshmati and Yang (2006) so we followed their future studies recommendation to examine the contribution of specific sub-sectors of ICT to China's economic growth. Second, we deconstructed China's enormous ICT industry by classifying and defining the sub-sectors of the industry that best fit the high-tech industry definition as it is generally conceived in the global ICT industry. Third, in order to provide an estimation of returns or lack of returns to ICT investment, we used regression analysis to measure the impact of China's government expenditures on ICT industry growth. Fourth, we discuss government policies effects on Chinese ICT development and investment patterns. Finally, we suggest guidelines for future research on sub-sectors of China's ICT industry. Our results add to understanding how China's government policies affect the growth of ICT sub-sectors and their contributions to GDP.

The structure of the paper is as follows: Section 2 discusses China's 10<sup>th</sup> and 11<sup>th</sup> 5 year plans and their intended impact on China's ICT industry.

Section 3 will review the regression analysis used to measure the impact of Chinese government expenditures on ICT industry growth and presents the empirical results. Section 4 discusses non-empirical data which identifies other factors as the driving force behind the development and success of the industry. Section 5 provides suggestions for ICT development and investment at the central government level. Section 6 concludes the paper and provides guidelines for future research.

## **2. 0 China's 10<sup>th</sup> (2000-2005) and 11<sup>th</sup> (2005-2010) Five-Year Plans**

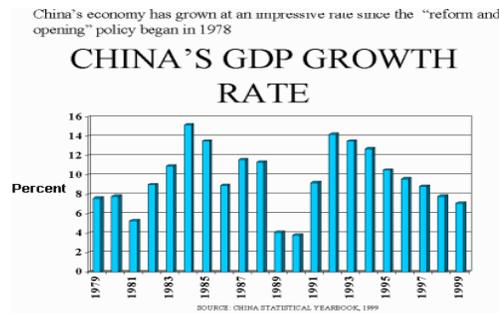
The beginning of the 21<sup>st</sup> century became an extremely important period not only for China but also for the entire world. The new scientific and technological revolution was rapidly progressing worldwide.

According to the Outline of the Tenth Five-Year Plan for National Economic and Social Development delivered at the Fourth Session of the Ninth National People's Congress on March 5, 2001, China's government set the main targets for economic and social development for the next five years, including doubling the 2000 GDP (8.9404 trillion yuan) by the year 2010 and accelerating development of the technology industry ("Report on the outline of the tenth five-year plan for national economic and social development," 2001, n.p.).

The Premier of State Council, Zhu Rongji, stated that China's government clearly understood that the success of the economic development of the country highly depended on scientific and technological innovation and developments. Taking this into consideration, the Communist Party of China called for strong efforts to promote technological progress and innovation in order to enhance the overall strength and sustainable development of the nation. According to Zhu Rongji, during the years of 2000-2005, China was to pursue those reforms, open the country wider for the outside world and break down the obstacles to the development of productive forces ("Report on the outline of the tenth five-year plan for national economic and social development," 2001, n.p.). Foreign companies were encouraged to open R&D institutions in China, while local technology firms were encouraged to conduct their research and development in foreign countries in order to promote the sharing of information and resources. In general, great importance was given to speeding up the development of the information industries. China believed that the promotion of the application of information technology was the current world trend in economic and social development and that it was the key link to upgrading China's industrial structure and realizing industrialization and modernization.

China's government understood that information technology needed to be used extensively in all circles of society and the use of computers and Internet needed to be wide-spread. Consequently, the promotion of digital technology and internet usage was started in various social sectors including governmental administration and management, public service, enterprise management and daily operations. In addition, a lot of attention was paid to accelerating the development of E-commerce: schools actively promoted computer and internet technology use for education; construction of the infrastructure for the information industry was strengthened; high-speed wide-band transmission networks were developed and improved; and the development of the software industry and integrated circuit industry was accelerated (China Internet Information Center, 2011, n.p.).

With the support of key policies implemented by the Chinese government during the Tenth Five-Year Plan, the country developed and implemented many endeavors in the information industry. During this time, output value, sales and profits of electronic and telecom manufacturing outperformed other industries. Technological development enabled the functioning of 670,000 websites, 430,000 China-coded domain names, and supplied 41.6 million computers with Internet access. By the end of 2005, there were 94 million Internet users in China. Optical cables extended about 2 million miles and became the main technology for transmitting information. There were 647.25 million registered telephone subscribers, resulting in 312.44 million landlines and 334.82 million mobile phone subscribers; this constituted the world's 2<sup>nd</sup> largest telephone network.



The 1978-2000 period saw the fastest development in China, with an average annual GDP growth rate of 9.5 percent, compared with 2.5 percent for developed countries and five percent for developing countries,”(China sees good beginning, 2001, n.p.).

According to the article “China sees good beginning,” the first year of the 10<sup>th</sup> Five-Year Plan turned out to be a milestone for China as their GDP grew by 7.4%, nearly seven times more than world analysts had expected (2001, n.p.). With such monumental growth, it appeared government ICT policies were working as intended as, the “IT industry ...[was] expected to reap a yearly income amount to take over 7 percent of China's GDP within five years, according to a forecast by the State Development Planning Commission (SDPC). An annual average growth of more than 20 percent will be achieved by mobile telecom. Handset users in China ...[were] expected to exceed 260 million by 2005” (China sees good beginning, 2001, n.p.). China’s western development strategy was working. As a result, China launched a number of gigantic projects, including a project to commercialize high-tech achievement.

China's 11th Five-Year Plan featured the development of the information industry. The Ministry of Industry and Information Technology (MIIT)'s key goals for the 2006-2010 timeframe were as follows: move the industry up the global value chain to higher value-added manufacturing and services; develop "global brands" for Chinese MNEs and increase domestic R& D capabilities; continued focus on government procurement and subsidies to pursue new technologies; foster the development of Chinese standards; and Accelerate construction of IT networks, particularly with regard to rural broadcasting, telecommunications, and telephone networks (PTL Group, 2009, n.p.).

As Hemashti and Yang (2006) found, China’s ICT industry substantially contributed to its GDP. Chinese government policies based on western paradigms were working as intended as the GDP was growing and ICT was making a significant contribution to that growth. We therefore decided to measure to what extent Chinese government expenditures aided the development and contribution of ICT to GDP. We completed a regression analysis on the relationship between government expenditures and the development of the Chinese high-tech industry, which is a specific subsector of the ICT industry in China, while also analyzing qualitative data for other factors that might have contributed to GDP growth. What we found is that Chinese government policies did contribute to the development of ICT growth and its increased contribution to GDP but not through the traditional strategy of increasing government expenditures. Rather than Chinese enterprises being the driving force of ICT development in China, western enterprises were one of the driving forces. This explains why the regression analysis in section 3 does not show a significant relationship between Chinese government expenditures aiding Chinese ICT enterprises’ development and contributions to China’s GDP. The policies aided foreign companies more than Chinese companies which of course was not the intent of the policies. The information analysis we discuss in section 4 supports the results of the regression analysis we discuss in section 3.

### 3.0 Methodology

This research uses correlation and regression statistical analysis method to test the significance of the correlation between two variables: China’s government policies and China’s high-tech industry.

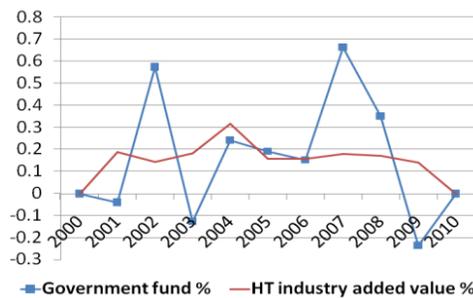
#### 3.1 Variables Choosing

Due to different ICT industry and sector classifications between China and other developed countries including the United States, we focused our analysis on China’s high-tech industry.

We initially defined the high-tech industry as including the information communication sector, the computer science sector, and the relevant information manufacturer sectors. However, information in the report titled *High-tech industry development trend in 2011*, revealed that data from the National bureau of Statistic of China included the mobile and communication sector, medical science and facilities sector, and the computer chemical science sector as contributing 71.76% to the gross high-tech industry output. Thus, we collected data from all of these subsectors as part of the high-tech industry and used that data as the representative standing for the performance of China’s ICT industry to do our statistical analysis. To quantize government policies in the high-tech industry, we chose government expenditures in the high-tech industry as another variable because increasing government expenditures is a traditional and important means to promote and support the development of a industry. Relevant error analysis is discussed in the statistic error analysis section.

### 3.2 Data Collection and Analysis

We collected all data from the “China Statistics Yearbook” on high technology industry from 2000 to 2010. The chart at right displays the changing percentages in government expenditures on the high-tech industry compared with the added value change of this industry. Results indicate that the change in government expenditures is more volatile than the change of added value. Further data and information analysis are as follows:



	Government fund	Government fund %	HT industry added value	HT industry added value %
2000	¥ 1,728,060,000	N/A	1995.3	N/A
2001	¥ 1,660,090,000	-3.93%	2370.4	18.80%
2002	¥ 2,615,080,000	57.53%	2714.8	14.53%
2003	¥ 2,285,300,000	-12.61%	3212.8	18.34%
2004	¥ 2,838,700,000	24.22%	4236.3	31.86%
2005	¥ 3,387,670,000	19.34%	4904.1	15.76%
2006	¥ 3,909,840,000	15.41%	5683.5	15.89%
2007	¥ 6,504,010,000	66.35%	6705.6	17.98%
2008	¥ 8,788,190,000	35.12%	7859.7	17.21%
2009	¥ 6,709,950,000	-23.65%	8963.8	14.05%
2010	N/A	N/A	N/A	N/A

#### Standard Deviation

	Government fund %	HT industry added value %
Mean	19.75%	18.27%
Std	30.34%	5.36%

#### Correlation analysis

Correlation	Government fund %	HT industry added value %
Government fund %	1	
HT industry added value %	0.053337038	1

#### 3.2.1 Standard Deviation Analysis

In the standard deviation chart, we found that China’s average government expenditure is 19.75%, which is similar to the high-tech industry added value increase rate of 18.27%. However, government expenditures are more volatile than the industry added value, which is indicated by the government fund standard deviation of 30.34% whereas the standard deviation of the high-tech industry added value is 5.36%. This was not our expectation as we anticipated China’s government to have steadily increased government expenditures on a yearly basis to support the development of this industry. Therefore, we believe our results may show that in the market economy, China’s government policies provided more flexibility to foreign entities, such as encouraging the investment of foreign information communication technology companies into local Chinese companies, to support the development of the indigenous Chinese high-tech industry.

#### 3.2.2 Correlation Analysis

The correlation between rate of government expenditure and rate of high technology added value is 0.0533, which means if China’s government increased its expenditure 1%, the added value of the high technology industry will increase 0.05% in response, and vice versa.

### 3.2.3. Regression Analysis

Assumption: X-variable is the change rate of government expenditure; and Y-variable is the change rate of added value in high technology industry. We assumed:  $Y = \beta X + \alpha$

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	6.53882E-05	6.53882E-05	0.019970691	0.891599943
Residual	7	0.022919469	0.00327421		
Total	8	0.022984857			
Coefficients					
	Coefficients	Standard Error	t Stat	P-value	
Intercept	0.180836677	0.02317856	7.801894508	0.000106938	
Government fund %	0.009422286	0.066674498	0.141317694	0.891599943	

Regression Statistics	
Multiple R	0.053337038
R Square	0.00284484
Adjusted R Square	-0.139605898
Standard Error	0.057220711
Observations	9

In regression analysis, R square is only 0.0028, which denotes that the X-variable can only explain 0.0028% change of the Y-variable. This finding shows that although we expected that China’s government expenditures would be a significant factor in the development of the high-tech industry, regression analysis shows that government expenditures are responsible for less 1% of development in this industry. These results support our supposition that there are other important factors affecting the development of China’s ICT industry.

In an analysis of the variance for the regression equation  $Y = 0.0094X + 0.181$ , the P-value was equivalent to 0, implying that there is no likelihood that the relationship developed by the model is out of mere chance. However, the significance of F is 0.8915, showing that we do not have enough sufficient data to reject the null hypothesis. This implies that there is a possibility that the X-variable and Y-variable have no relationship. This finding also supports our supposition that there are other important factors affecting the development of the ICT industry.

### 3.3 Statistic Error Analysis

The main error of our statistical analysis is the variables we chose. Because of the totally different ICT industrial classifications between the United States and China, we used Chinese ICT sub-sector high-tech industry as we felt that sub-sector was the most comparative to the United States ICT industry. What’s more, our sample size was too small. This resulted in 8 degrees of freedom which lead to an error between the 10-year sample and the whole population.

### 4. 0 “True”ICT Market Driving Forces

China’s government ICT policies were intended to primarily benefit Chinese enterprises in particular, and China’s economic growth overall. Unfortunately, that has not been the result. Lutao Ning explains, “China’s ICT trade and production structure includes a large proportion of industrial growth which was not generated by Chinese enterprises but overwhelmingly by FIEs [Foreign Investment Entity].... The various forms of FIEs have, since 1994, surpassed all domestic enterprises, soaring to a 92 percent share of the total exports in 2004” (2009, p.76). According to Haibo (2001, quoted in Ning, 2009, p.69) as a part of China’s opening-up agenda, in 1992 President Deng made special provisions and liberal policies much more widely available to foreign direct investment. “This was done to build a foundation for the ICT industry and to increase technological development” and to gain financing to invest in other areas of the economy for development.

Ning continues by expressing that though it was unintentional, the consequences of this government policy and others that were later enacted resulted in wholly foreign-owned enterprises becoming the main forces driving China’s ICT industry (2009, p.79). Ning declares that by 2004, wholly foreign-owned enterprises imported 82 percent of China’s ICT trade. In contrast, DFES had a trade deficit, importing 14 percent of the total imports in 2004 Ning (2009, p.77). Add to this Ning’s belief that “FIEs’ lower profit over sales ratio and larger percentage of exports imply that their foreign trade activities are mainly taking place within MNCs themselves” (2009, p.78) and one can see why a significant relationship was not found between Chinese government policies and their benefit to Chinese enterprises. Ning also believes that, “the OECD ICT report shows that China’s policies have become inflexible and irrelevant in responding to the changing international competition.

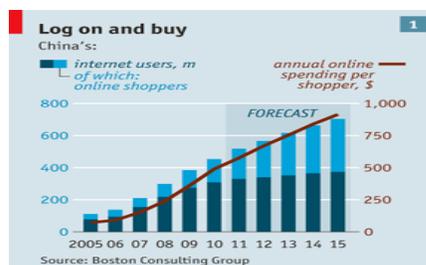
They still attempt to follow the old EAT development strategies in the hope of fulfilling a nationalistic sentiment: that of building a relatively independent national ICT industry with an entire industrial value chain and with a number of Chinese multinational enterprises all with their own components, brands, and cutting-edge technological capabilities. This policy focus is inconsistent with the emerging pattern of GPNs. The real result of these strategies, behind the industry's phenomenal growth and global expansion, has been obviously contrary to what Chinese policy makers intended" (2009, p.89). China's government policies for the last ten years, though unintentional, have not served its development goals for the Chinese ICT industry very well. However, the future for Chinese policies to greatly aid in the development goals of its ICT industry looks much brighter as China has adopted a different strategy from the one it has used in previous years.

### 5.0 China's Future Development Overview of ICT Industry and Policies and Planning Prediction Using Telecommunications and Internet/ Broadband Sub-Sectors as Examples

According to Dr. John C. Chiang, President and Managing Director of the United States Information Technology Office (USITO) in Beijing, China, "the information and communications technologies (ICT) industry is the backbone of the Chinese export driven growth strategy, which many argue as the primary driver of China's economic growth. Recent ICT policy initiatives demonstrate China's shifting strategy in pursuing a different path for the next phase of economic growth. Promoting indigenous innovation and strengthening information security may be considered the two major thrusts of Chinese ICT policy initiatives. Technical standards, IPR treatments, government procurement, and special industry incentives are some examples of the former domain; internet filtering, compulsory certification of information security product and encryption control are examples of the latter. Many of these initiatives are controversial in the international trade arena. However, the real challenges of these policy initiatives concern whether they work to achieve the Chinese government's goal of maintaining sustainable growth" (2010, n.p.). This new strategy further confirms our findings and concerns discussed above, that is, previous government strategies did not help indigenous enterprises in the way that the government had intended. As revealed in the "New Zealand trade and enterprise market profile," "The government has focused on developing basic software industry capability, the development of integrated systems, large scale application software and on the development of next-generation internet projects. It has also announced plans to undertake many high-technology projects in the next few years: IC chip upgrade 909 project, LTE-4G development, Next-generation IPv6, Broadband upgrade, Biedou-2 satellite project" (2001, p.5). Considering that a much higher proportion of people in China use information communication technologies than in any other developing country with a similar per capita income, this new strategy is much more likely to accomplish the goals the government intends for it to.

#### 5.1 Internet Infrastructure and Ecommerce

The China Internet Network Information Centre estimates that China's online population, already the world's largest, has risen by 6% to 485m this year. Two-thirds of the Chinese population is not yet online. See chart below (Hangzhou, 2011, n.p.).



Dong Baoqing, deputy director of the Ministry of Industry and Information Technology's informatization promotion department was quoted in the China Daily as saying that the sales volume of online shopping in 2015 is expected to account for more than 9% of total retail sales. These figures will be included in China's 12<sup>th</sup> five year plan (2011-2015) for ecommerce development that will be released this year. The five-year plan will encourage the development of e-commerce as well as update and provide more policies that support its expansion. The main tasks include expanding the scope of ecommerce to such industries as heavy industry, logistics and tourism, improving online sourcing and retailing capability, boosting cross-border and mobile ecommerce, and creating a safer and more trustworthy e-commerce system (Xin, Chen, 2011, n.p.).

Li Jinqi, director of the electronic commerce and informatization department at the Ministry of Commerce stated that his ministry has been working with other sectors to develop e-commerce in small and medium-sized enterprises. They are also working to draft standard contracts for online businesses among companies. There are currently plans in the works to carry out pilot programs in some cities and enterprises to conduct e-commerce. Those findings will be used to help expand e-commerce to more areas (Xin, Chen, 2011, n.p.).

As the use of the internet grows heavier, it becomes more customized to the Chinese culture. “The beauty of the internet is that it easily adapts to local conditions,” says Paul Zwillenberg of the Boston Consulting Group (BCG). The Chinese internet is an excellent example of the argument that far from creating uniformity, the global network is shaped by local forces. There are four forces that shape the Chinese internet. These forces are the demands of Chinese consumers, the attitudes of Chinese entrepreneurs, China’s offline economic development, and the role of the state (Hangzhou, 2011, n.p.).

### 5.1.1 Chinese Internet Consumers and Entrepreneurs Drive Ecommerce Development

Table 5 Rankings and Categories of Internet Applications

Rank	Application	Use Rate	Category
1	Online music	85.5%	Internet entertainment
2	Internet news	78.7%	Information acquisition
3	Instant messaging	72.2%	Communication
4	Search engine	69.4%	Information acquisition
5	Online video	65.8%	Internet entertainment
6	Online game	64.2%	Internet entertainment
7	E-mail	55.4%	Communication
8	Blog	53.8%	Communication
9	Forum/BBS	30.4%	Communication
10	Online shopping	26.0%	Business transaction
11	Online payment	22.4%	Business transaction
12	Online stock	10.4%	Business transaction
13	Travel reservation	4.1%	Business transaction

In examining Chinese consumers, their internet users are younger than their Western counterparts that first started logging on about twenty years ago. They are mostly poor and they are hungry for entertainment. Foreign internet companies have done quite well as investors in china. However, they have struggled to duplicate their success in the Chinese market. The above chart was taken from CNNIC’s 24<sup>th</sup> report in June 2009. This chart lists the top uses of the internet as entertainment, information, and communication. At this point in time, online shopping was rapidly growing.

Websites offering services such as Amazon.com, Yahoo, and EBay were slower to develop in China. It wasn’t until 1999 that Dangdang Inc. was established. Baidu started in 2000, and Taobao.com, an online auction subsidiary of Alibaba group, was founded in 2003. China’s second-biggest internet firm by market capitalization, Tencent, started out as a chat service. It quickly grew by offering China’s youth a cheap way to communicate and have fun. Tencent’s chat services currently have 674 million user subscribers. Most of the websites services are free. The firm makes most of its money by selling virtual goods for play money that users buy with real cash (Chou, Wayne, 2011, n.p.).

Taobao, which is owned by Alibaba, was launched to compete with the Chinese service of eBay. Its internet traffic quickly overtook its competitor because it does not charge transaction fees. Taobao’s greatest achievement has been to overcome the largest barrier to online shopping in China-- lack of trust. Alibaba utilizes an online payment system named Alipay. Alipay handles the world’s largest volume of transactions by value. It operates using an escrow function that withholds payment until goods have been received. Taobao currently has 370 million registered users and accounts for three out of four online sales in China (Hangzhou, 2011, n.p.).

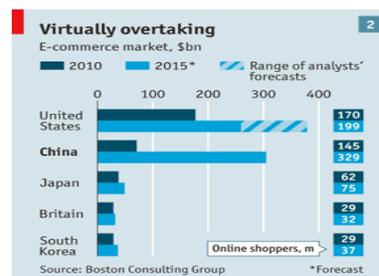
The latest trend to hit the Chinese market has been group buying. This allows online users to receive coupons for huge discounts from businesses provided that a certain volume of sales is reached. Groupon.com, the largest United States group buying website, has recently entered the Chinese market looking for a share of this large growing market. Groupon, however, faces many difficult challenges. Many international companies fail to understand the Chinese market. Groupon has more than 1,700 competitors in China that have started since the group buying concept started in late 2008.

Recently meituan.com, a popular Chinese group buying website, filed a lawsuit against International Dairy Queen for failing to honor group buying coupons. Dairy Queen insists that they never issued the coupons (Chou, Wayne, 2011, n.p.).

China's internet entrepreneurs are different from their Western counterparts. There are many part-timers. Students have flocked to Taobao in masses to sell their goods. Dorm rooms have been converted into storerooms of items waiting for shipment. Full-time entrepreneurs may have less experience than their Western counterparts; however, they make up for it in effort. Chinese work tirelessly and practically abandon life in order to have a shot of making it big. The will to win and the abundance of venture capital has made China's internet a ferociously competitive marketplace.

## 5.2 China's Broadband Infrastructure Aids Ecommerce Contribution to GDP

China's relatively underdeveloped economy has also played a role in the development of ecommerce. In China, online companies are more likely to fill a void, whereas online companies in Western countries often disrupted existing industries. Offline businesses in China are often much less efficient. Conventional retailing is fragmented and underdeveloped in most areas with the exception of large cities near the coast. Much of the country has been converted by fast internet pipes. It is currently estimated that a basic broadband connection costs less than 100 yuan a month. Boston Consulting Group has estimated that the annual value of China's e-commerce market would quadruple by 2015, to \$305 billion. It may then be the world's largest (Hangzhou, 2011, n.p.).



The media industry has created another opening for online-video sites, such as Youku. It looks (and sounds) much like YouTube but its boss, Victor Koo, compares it to Hulu and Netflix, American sites that deliver television programs and films over the web. Since most Chinese are just discovering digital video, users generate only about a quarter of Youku's content. The rest is made professionally, for instance by television stations or Youku itself.

## 5.3 The Role of the State in the Growth and Social Importance of the Internet

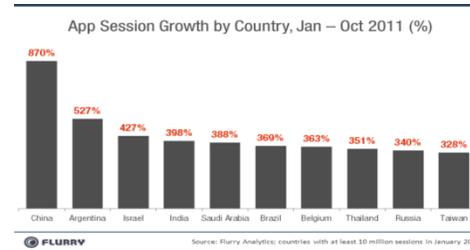
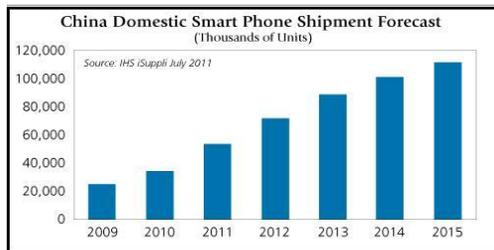
Regulation was rather lax until 2007. As the internet's economic and social importance has grown, so has the need for political intervention. An agency to oversee the internet was set up in May 2010. In June, the government published a paper outlining its regulatory plans. Regulation mostly involves licensing and self-censorship. Xu Xiaolan, deputy director at the China Center for Information Industry, has suggested that laws be passed to regulate ecommerce and to also promote it by establishing an "Internet Economic Zone." Xu hopes it will recreate the success of the special economic zones which have been recognized as a major contributor to China's rapid growth (Chou, Wayne, 2011, n.p.).

Will China's internet continue to have distinctively Chinese characteristics? As the industry and China's economy grows, and as the population grows older and richer, some differences will fade. The dominance of the three Chinese internet powerhouses, Alibaba, Baidu and Tencent will probably prevail for quite some time. They are well versed in dealing with state agencies and can afford to spread out the cost of regulation. Expanding abroad is largely untested. Tencent owns a stake in Mail.Ru, a Russian portal. Expanding abroad will not be easy. Being Chinese is a cultural advantage at home but it may be a disadvantage elsewhere. Still, China's internet will have a global impact. In the future we may see some of China's internet characteristics to be adopted in the West (Hangzhou, 2011, n.p.).

## 5.4 Telecommunications: Mobile Technology

China has the largest market in the world for mobile communication technology. Data released by MIIT indicated that the number of Chinese mobile phone users reached 952.31 million users by the end of September, 2011.

Of this amount, 102.46 million users had phones with 3G technology (Xinhua, 2011, n, p.). The vast majority of users still utilize the old 2G mobile phones. A factor holding up China's expansion into 3G is the cost of the smart phone. However, rapidly falling handset prices is quickly changing that trend. According to iSuppli market research Chinese smart phone shipments will rise to 54.1 million units this year. Total China domestic sales are expected to top 111.6 million per year by 2015 (Blanco, R, 2011,n.p.).



With such a new demand for smart phones, mobile apps have seen as astronomical growth in China. There are ten countries that have seen the largest growth in consumer adoption this year. China's growth is astronomical. The top 100 countries are averaging session growth of over 200% whereas China is showing more than four times this growth rate. China is now the second largest country in the number of app sessions per month (Andrews, R, 2011, n.p.).

At the end of 2010, the estimated number of people who accessed the internet through mobile phones stood at 303 million. By the end of June, that number had increased to 485 million. This was an increase of approximately 60%. Next year the number of users to access the internet via mobile technology is expected to outpace those connecting via the computer. The reason for this hyper-growth is falling prices for older iPhones and capable low and mid-range android handsets that are now available in emerging markets (Xinhua, 2011,n.p.).

China Mobile is the world's largest mobile phone operator. The company currently has more than 630 million subscribers (China Mobile Limited.com). The production of smart phones has increased 50 percent year on year globally. This increase has created a demand for faster connectivity. China Mobile has recently debuted small-scale 4G demonstration networks. The technology will provide faster broadband wireless services to meet future demand that the current 3G network could not deliver.

Wang Xiujun, chief engineer of the Ministry of Industry and Information Technology (MIIT), was quoted on Monday, October 31, 2011 in an interview with China Daily. He stated that the government will increase support of mobile technology because it "promotes industrial integration and leads to revolutionary changes in development and technology."(Xinhua, 2011,n.p.) He also stated that China will speed up comprehensive upgrades for its information networks and boost the development of 3G technology. The Chinese government is placing more importance on the protection of users' personal information. This in turn will allow a healthy environment in which the mobile technology sector can continue to thrive as it develops.

## 6.0 Conclusion and Recommendations

This paper examined China's government expenditures and policies for the high tech industry and the information communication industry to determine if they were the main driving forces behind the booming success of those industries in China. In our research for this paper, we conducted a correlation and regression analysis of our empirical data. The results denoted that China's government expenditures in the high-tech industry did not have a very significant effect on the development of the indigenous high-tech industry. However, our non-empirical data showed that China's government policies had a significant effect on the development of information communication industry, which had become one of the most popular industries in China, having contributed 10% of China's GDP in 2010. After analyzing our non-empirical data, we concluded that one of the "true" ICT market driving forces were foreign-owned enterprises' investments into China's ICT industry. This was not the original intention of the government's policies. As a result, China has very recently embarked on new strategies for developing its indigenous ICT industry. These strategies include capitalizing on China's extremely successful telecommunications and internet/broadband industries.

We therefore make the following recommendations: future analysis of the success of the 12<sup>th</sup> Five-Year Plan in developing China's indigenous ICT industries, especially the high-tech industry and the information communication industry; China's government should increase its expenditures in indigenous R&D development in the ICT industry; and increased collaboration and training of local Chinese companies with foreign companies that have advanced technology production and knowledge.

## References

- Andrews, R. (2011) "Mobile apps seeing 'astronomical' growth in china," [Internet], *PaidContent.org: UK, The Economics of Digital Content*. Available from: <<http://paidcontent.org/article/419-mobile-apps-seeing-astronomical-growth-in-china/>> [Accessed 05 November 2011].
- Blanco, R. (2011) "Mobile companies in this emerging market are poised for strong growth," [Internet], U.S.A. *Penny Sleuth: Small-Cap Stocks, Options & High-Growth Opportunities*. Available from: <<http://pennysleuth.com/mobile-companies-in-this-emerging-market-are-poised-for-strong-growth/>> [Accessed 05 November 2011].
- Chiang, J.C. (2010) "The challenges of china's ict policies," [Internet], Palo Alto, *The Freeman Spogli Institute for International Studies at Stanford*, Available from: <[http://fsi.stanford.edu/events/the\\_challenges\\_of\\_chinas\\_ict\\_policies](http://fsi.stanford.edu/events/the_challenges_of_chinas_ict_policies)> [Accessed 29 October 2011].
- China International Science and Technology Cooperation. (2011) "China's s&t community takes new challenges," [Internet], *China International Science and Technology Cooperation*, Available from: <<http://www.cistc.gov.cn/englishversion/newsletters/Article.asp?column=123&id=896>> [Accessed 06 November 2011].
- China Internet Information Center (2011) "Premier zhu rongji's explanation of 10<sup>th</sup> five-year plan," [Internet], *China Internet Information Center*, Available from: <<http://www.china.org.cn/e-15/15-3-g/15-3-g-1.htm>> [Accessed 01 November 2011].
- China Mobile Limited (2011) "Operation Data," [Internet], *Chinamobile.com*, <<http://www.chinamobiletd.com/?lang=en>> [Accessed 05 November]
- Chinese Government's Official Web Portal. (2011) "Report on the outline of the tenth five-year plan for national economic and social development (2011)," [Internet], *Chinese Government's Official Web Portal*, Available from: <[http://www.gov.cn/english/official/2005-07/29/content\\_18334.htm](http://www.gov.cn/english/official/2005-07/29/content_18334.htm)> [Accessed 30 October 2011].
- Chou, Wayne, March 14, 2011, "E-Commerce offers development opportunities," [Internet], *Chinadaily.com*, Available from: <[http://www.chinadaily.com.cn/bizchina/2011-03/14/content\\_12167987.htm](http://www.chinadaily.com.cn/bizchina/2011-03/14/content_12167987.htm)> [accessed 22 October 2011].
- Digital Media Across Asia (2009) "China technology implications," [Internet], *Digital Media Across Asia*, Available from: <<http://comm215.wetpaint.com/page/China%3A+Technology+Implications>> [Accessed 05 November 2011].
- Donghong, C. and Hepeng, J. (2010) "China reaps rewards of ict growth," [Internet], *The Science and Development Network*, Available from: <<http://www.scidev.net/fr/opinions/la-chine-r-colte-les-fruits-du-d-veloppement-des-tic.html>> [Accessed 29 October 2011].
- English.PeopleDaily.Com. (2011) "China sees good beginning for tenth five-year plan," [Internet], *China, English.PeopleDaily.Com* Available from: <[http://english.peopledaily.com.cn/200112/06/eng20011206\\_86040.shtml](http://english.peopledaily.com.cn/200112/06/eng20011206_86040.shtml)> [Accessed 05 November 2011].
- Haibo, W. (2001) "The industrial history of the new china 1979-2000," Beijing, Economic management publisher. Quoted in Ning, L. (2009) "China's leadership in the world ict industry: a successful story of its "attracting-in" and "walking-out strategy" for the development of high-tech industries?" *Pacific Affairs* 82 (1) Spring, pp.67-91.
- Hangzhou, J. (2011) "An internet with chinese characteristics," [Internet], *Economist.com*, Available from: <http://www.economist.com/node/21524821>, [Accessed 22 October 2011]

- Heshamati, A. & Wanshan, Y. (2006) "Ict contribution to the chinese economic growth," [Internet], *Seoul, The Ratio Institute and Techno-Economics and Policy Program College of Engineering, Seoul National University*. Available from:  
<[https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=1oFIzryXSMXs2UYqYRRRBDONuD4O77q9CyeTB6tYh0T-C93xfDWnHfd1YbZH&hl=en\\_US](https://docs.google.com/viewer?a=v&pid=explorer&chrome=true&srcid=1oFIzryXSMXs2UYqYRRRBDONuD4O77q9CyeTB6tYh0T-C93xfDWnHfd1YbZH&hl=en_US)> [Accessed 04 November 2011].
- National Bureau of Statistics of China. (2010) "Chinese Statistics Yearbook, 2000-2010," [Internet], <<http://www.stats.gov.cn/english/>> [Accessed 30 October 2011].
- New Zealand Trade and Enterprise (2011) "Ict market in china: market profile march 2011," [Internet], New Zealand, *New Zealand Trade and Enterprise*. Available from:  
<<https://docs.google.com/viewer?url=http%3A%2F%2Fwww.nzte.govt.nz%2Fexplore-export-markets%2Fmarket-research-by-industry%2FInformation-and-communication-technologies%2FDocuments%2FICT-market-in-China-March-2011.pdf>> [Accessed 04 November 2011].
- Ning, L. (2009) "China's leadership in the world ict industry: a successful story of its "attracting-in" and "walking-out strategy" for the development of high-tech industries?" *Pacific Affairs* 82 (1) Spring, pp.67-91.
- NSD Bio Group, LLC (2009) "Research report on chinese high-tech industries," [Internet], *U.S. China Economic and Security Review Commission* (January 2009) pp.1-54, <[http://www.uscc.gov/researchpapers/2009/Research\\_Report\\_on\\_Chinese\\_High\\_Tech\\_Industries.pdf](http://www.uscc.gov/researchpapers/2009/Research_Report_on_Chinese_High_Tech_Industries.pdf)> [Accessed 04 November 2011].
- PTL Group of Companies (2009) "Ict industry in china," [Internet], China, PTL Group of Companies. Available from: <<http://www.ptl-group.com/index.php/en/china-blog/226-ict-industry-in-china>> [Accessed 04 November 2011].
- Xia, J. (2010) "Linking icts to rural development: China's rural information policy." [Internet], *Government Information Quarterly* v. 27 no. 2, pp. 187-95. [Accessed 22 October 2011].
- Xin, Chen. (2011) "E-Commerce to quadruple by 2015, official says," [Internet], *Chinadaily.com.cn*, Available from: [http://www.chinadaily.com.cn/bizchina/2011-07/13/content\\_12893796.htm](http://www.chinadaily.com.cn/bizchina/2011-07/13/content_12893796.htm), [Accessed 22 October 2011].
- Xinhua. (2011) "China spurs growth of mobile internet," [Internet], *Chinadaily.com.cn*, Available from: [http://www.chinadaily.com.cn/bizchina/2011-11/01/content\\_14015700.htm](http://www.chinadaily.com.cn/bizchina/2011-11/01/content_14015700.htm), [Accessed 5 November 2011].
- Zhize Zeng, Jun Wang, Hongyu Li, Zhongping Lin, Yu Zhang, Jiang Jiang (2010) "High-tech industry development trend in 2011," [Internet], *Hexun.com*, Available from: <<http://stock.hexun.com/2010-12-30/126505424.htm>> [Accessed 04 November 2011]