

6th World Media Economics Conference

Centre d'études sur les médias and Journal of Media Economics

HEC Montréal, Montréal, Canada
May 12-15, 2004

Digital Television in China: Opportunities and Challenges, 2004

T.Y. Lau, University of Washington, United States
Guangchao Feng, Henan University, China

This paper seeks to examine the development of digital television in China, which potentially is the world's largest market. By employing a conceptual framework of a triangular relationship between the government, service providers and users, the paper will explore the technical, economic, and political implications of adopting digital television in China. Then, it will use several cases studies to illustrate the progress of introducing digital television up to the end of 2003.

Current Status of Television Broadcasting Industry in China

As the world's most populous nation, China's television broadcasting market is, not surprisingly, huge. As Table 1 shows that the total number of television households is about 348.4 million as of November 2000. More than 470 million television sets are in use. China also is the world's largest analog cable television market, with 98.4 million households subscribing cable television as of end of 2002 (National Bureau of Statistics, 2003).

Table 1 Current Status of Television Broadcasting Industry in China, 2002

Total households in China by November 2000	348.4 million
Total TV sets	More than 470 million
TV sets per one hundred persons in the cities	121 sets
PC per one hundred persons in the cities	13 sets
TV population coverage	94.5%
Cable subscribers	96.4 million households
The total optic fiber length by June 2001	More than 3 million kilometers
TV stations	360
Note: All the time bases are by the end of 2002, if they are not disclosed specifically. Source: National Bureau of Statistics of China(NBS), State Administration of Radio Film and Television of China (SARFT) , both in 2003	

What is Digital Television in China?

China has tried to keep pace with the world's push for digital television development since 1978. It is useful first to understand the concept of digital television in China. Digital television industry in China mainly refers to the cable television-based Hybrid Fiber/Coaxial (HFC) network. Therefore, the conversion of analog cable television into digital format will be crucial in China.

Digital television in China can be broadly defined according to the world's three commonly used categories, that is standard definition television (SDTV), enhanced definition television (EDTV) and high definition television (HDTV) (Consumer Electronics Association, 2000)

In addition, digital television also can be classified by its delivery methods, which includes digital terrestrial television, digital cable television, digital satellite television and IP television, which its signal transmission is over the IP network, such as broadband TV from Microsoft.

Furthermore, the definition of digital television in China can be classified microscopically, that is, digital television broadcasting program; and macroscopically, which includes datacasting, digital broadcasting, interactive television, video-on-demand (VOD), SMS-TV, internet television, etc.

The paper uses the concept based on the broadcasting network, the two digitalized formats—internet television and mobile television -- are excluded in the paper.

In terms of technical standards, three standards are being used in the world, as shown in Table 2. They represent the Japanese standards (ISDB), the North American standards (ATSC) and the European standards (DVB). It will be interesting to find out what technical standards China will adopt as it has become an active member of the World Trade Organizations since 2002(DVB, 2004; ATSC, 2004).

There is a reason for China to set its own technical standards. The issue is similar to that of the mobile phone standards, which China believes that its market is big enough to be self-sustaining. The key issue is that if China adopts a foreign technical standard, it will have to pay for the use of patent. For example, Korea's digital television has adopted the U.S. ATSC standards, and it has to pay US\$40 royalties for each IC used in the television set. It is estimated that if China uses a foreign standard, it may have to pay more than Renminbi 300 billion Yuan (US\$37.5 billion) (Economic Observers Newspaper, February 16, 2004; NBS, 2003).

The Importance of Mass Media in China

It is important to examine digital television in China because mass media play a very important role in the way the Chinese leaders govern the country. The Chinese Communist Party (CPC) firmly manipulates the people's ideology and news media. For

many years, it has prohibited private investment into media organizations. To ensure that all Chinese people receive the government's orders, the government attaches much importance to building the television broadcasting infrastructure by providing full funding to build their broadcasting facilities and equipments. Therefore, as shown in Table 1, television coverage has reached almost 94.5% by the end of 2002, serving its 1.2 billion television populations. Furthermore, cable television serves almost 96.4 million households, which is 28% of total households (National Bureau Statistics, 2003).

However, the sole state-funding model has changed since China adopts a new style of socialism. The Chinese central government has stopped to fund the mass media gradually. Thus, many media groups, which in many ways are similar to the media groups run in the capitalist words, has popped up. The Hunan Province Media Group is one of the pioneering examples, which got its one-page coverage in the New York Times, in October 2000 (BBC Monitoring, November 9, 2002).

In September 1999, the Chinese government issued an administrative order to require all terrestrial television stations and cable television systems merge into one single entity (ChinaTV-Net.com, 2003)

After the merger, there are still three forms of television broadcasting available in China, which are terrestrial television, cable television and satellite television. There were 360 terrestrial television stations in China, down from 961 before the merger in 1999 (Zhao and Wang, 1995).

In terms of cable television, majority of the cable television subscribers use uni-directional HFC network, which interactive television services are not feasible. All HFC networks of China's cable television cover frequency of more than 550M. Most metropolises may exceed 750M. Some cities even are up to 1G. Therefore, technically, these HFC networks can provide digital television and interactive television services. For example, Shanghai has most of these services available.

In terms of satellite television, all provincial television stations have provided uplink signals, which cover most of the territories in China and some neighboring countries. Since 1993, China's satellite policy has forbid the general publics to receive foreign television channels. Only 30 foreign satellite television channels are officially granted to land through the hotels with higher than 3-stars ratings. At present, 3,656 of the 8,880 above 3-star hotels (41.2 percent) are eligible to receive satellite television channels (China National Tourism Administration, 2003).

Conceptual framework used in the Study—who are the Players?

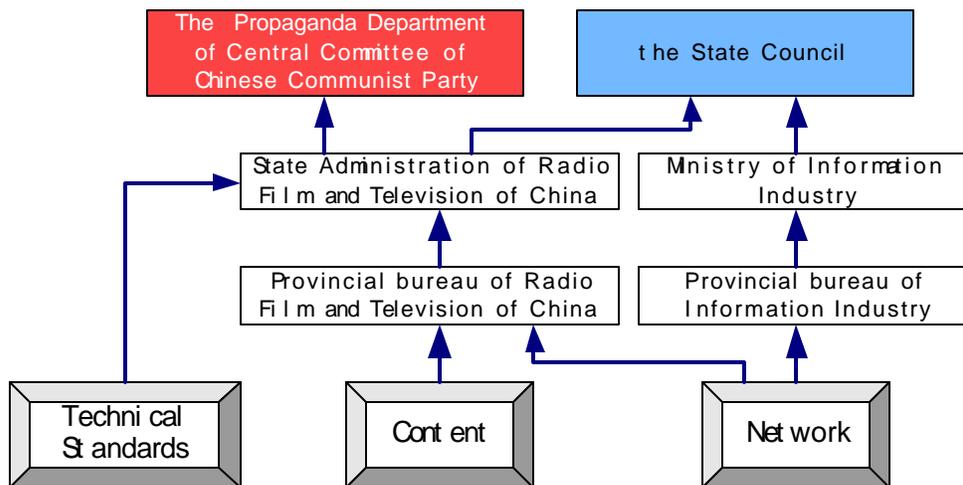
The study will employ a triangular relationship between the government, service providers and users in examining the digital television policy and development in China. The conceptual framework helps examine three key questions: (1) Who sets the policy? (2) Who has influences in the policy-making process? (3) What is the role of the service providers?

The Role of Government

Practicing the “big government” concept, the Chinese Communist Party definitely is highly visible in policy making, planning and implementation. The Propaganda Department of Central Committee of CPC is the de facto top administrator of radio and television broadcasting. The State Administration of Radio, Film and Television (SARFT) functions as a ministry of the State Council to manage radio and broadcasting nationally. The management of Chinese radio and television broadcasting stations is separated into three parts, namely content, technical standards and network. The Propaganda Department of CPC is the top decision-maker of ideology (content). SARFT sets and administers content and network policy. (See Figure 1).

However, administrative jurisdiction overseeing the network of the radio and television broadcasting industry’s infrastructure is controversial because both SARFT and Ministry of Information Industry (MII) claim jurisdiction. MII was founded in 1998 by the State Council to oversee China’s infrastructure in terms of hardware and standards, which include radio and television broadcasting, internet, mobile phones, etc. However, SARFT insists that radio and television broadcasting is a tool to convey ideology and so it is more than an issue of infrastructure. To complicate the matters more, because of technology convergence, cable television operators also serve as internet service providers (which intrudes into the infrastructure territory of MII). Therefore, the jurisdiction of who determines digital television policy and determination is not clear in China until the roles of SARFT and MII can be clearly separated by the State Council.

Figure 1 Government organization chart in Chinese television broadcasting



In July 2003, SARFT issued “The Transitional Timetable of Digitization for Cable Television in China,” which had the following targets: (a) digital cable television subscribers will exceed 30 million by 2005, (b) cable television will be fully digitalized by 2010, (c) analog broadcasting will terminate completely by 2015, (d) broadcast more

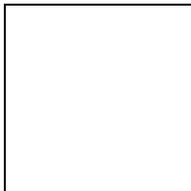
than 10 channels carrying pay digital television and some cable digital television programs within 2003, (e) develop one million set-top-box subscribers, (f) paid digital television channels reach 50-80, (g) cable digital television programs reach 150 channels, and (h) set-top-box subscribers reach 30 million by the end of 2005. Overall, together with the development of digital television, China may reach 96 percent television coverage, and cable subscribers reach 150 million by 2005 (SARFT, 2003; Zhang, 2001). As was explained earlier, because of the need of coordination between SARFT and MII, a delay is expected. (See Appendix I—The Chronology of Digital Television Timetable in China for more details).

Service Providers--The industry chain

Operators / Manufacturers

Figure 2 shows the chain of service providers involved in digital television development in China. The most important are the manufacturers because the technical standards adopted may involve the 200 million terrestrial television households and the almost 100 million cable television subscribers (Economic Observers Newspaper, February 16, 2004).

Figure 2 Television Broadcasting Industry Chain



At present, China has decided to use its cable television systems as the delivery methods of digital television. Despite that the Digital Television Standards Working Group was established in 2000, a finalized policy has not been agreed upon (Economics Observer Newspaper, February 16, 2004). Two groups of university researchers from Tsinghua University in Beijing and Shanghai Jiaotong University are working separately on their proposals on the technical standards. Their research funding is supported by various manufacturers who have heavy stakes in digital television's development. It is reported that the Tsinghua University researchers' funding is supported by eight television set manufacturers, including Changhong, TCL, Haier, and Konka. The Shanghai Jiaotong University researchers' funding is supported by television broadcasting system manufacturers, such as Guangdong Electronics, and Guangdong Information.

Set-top box manufacturers also have heavy stakes. At present, set-top boxes and equipments cannot be sold to users directly. Therefore, the line between manufacturers

and users is broken, as shown in Figure 2. It is estimated that the potential market values may amount to Renminbi 470 billion Yuan (US\$58.75 billion), assuming that there are at least 470 million analog television set and each set-top box costs about Renminbi 1000 Yuan (US\$125) (National Bureau of Statistics, 2003; SARFT, 2003)

Other Technical providers

Besides set-top box manufacturers, there are other related providers in the digital television's overall industry chain. They include conditional access (CA), middleware, video-on-demand (VOD), Datacasting, etc. Because the Chinese market is quite small currently, all of these technical providers are mainly foreign companies.

Program Content Providers

When digital television technical standards are decided and adopted, the program content providers will need to change. Understandably, the program content providers are waiting for the policy to be announced. And, they will not rely on government subsidies because 90 percent of the television stations' revenues and funding are from advertising (Jia, 2003).

The Perception of Users

Clearly there is no clear consumer demand for terrestrial and digital television users in China. This shows that China's digital television market at present is waiting for the technical standards to be set and then the service providers' switch to these new systems. The satellite television market in China is too small because only a limited number of hotels can receive foreign satellite television channels for their hotel guests. Interactive television and other digital television projects are still in experimental stages.

Issues involving the Adoption of Digital Television in China

Therefore, the study of the adoption of digital television may be classified into the following factors: technical, economical and social.

Technical: The technical factor covers three areas: production, transmission and reception platforms. Studios of major television stations have gone digital because the standard of digital studio has been enacted. Transmission standard is classified into satellite television, terrestrial television and cable television (HFC). The satellite standard has been determined as DVB-S; cable is DVB-C(64QAM, impending approval by administration). Terrestrial television is still under consideration of proposals submitted by various interested parties. They include General Group of State Development and Planning Commission' OFDM (modulate data in QAM and QPSK; and it can transmit one HDTV program and six SDTV programs), VSB from Academy of Broadcast Science of SARFT (16QAM), Tsinghua University's SOSDM (C-QAM aim at fixed users;

COFDM aim at mobile users). In addition, Shanghai Jiaotong University, University of Electronic Science and Technology at Chengdu, Sichuan Province also present their plans.

Table 2 the digital terrestrial TV standards around the world

	Standard	Other supporting countries/ Regions
U.S.A	ATSC	Korea, Canada, Taiwan (not compulsory), Argentina
European Union	DVB-T	Australia, India, Iran, Russia, Singapore, South Africa
Japan	ISDB-T	None
China	DVB-T biased, set self-owned	Hong Kong intended

SARFT has recommended several conditional access (CA) standards, and this decision will affect entry into the digital cable television market in China. For example, Beijing Gehua Cable Corporation has stopped its preliminary collaboration plan with Canal Plus. Besides, as to the standards of middleware, SARFT recommended the DVB-MHP, which may impact foreign technical providers not basing on MHP, such as OpenTV.

Economical: Most cable companies in China lack funds to reconstruct cable network or to provide value-added interactive television services. Despite that foreign investors are eager to participate, they are forbidden to invest on the cable network. Another economic factor concerns the consumers' purchasing power. Statistics of 2000 show that the income per capita of China is about US\$930, as compared with \$US\$36,300 in the United States and US\$27,000 in Japan. (National Bureau of Statistics, 2003; CIA, 2003; Zeng, 2002)

Social: There are irreconcilable contradictions between cable operators at the provincial level and city level. In the past, the relationship is that of boss-subordinate, meaning the provincial cable operators are the boss. The provincial cable operators demand that digital television platform, including conditional access (CA) and subscriber management system (SMS) throughout the province should be unified. All but the cable operators in the city level would not rather do so.

Case Studies

After exploring the various factors related to the adoption of digital television in China, we will introduce several case studies here. Table 3 shows some of the interactive television projects tested in China between 2001 and 2003.

Table 3 Examples of Interactive TV Projects in China

Providers	Projects	Partner	Date
Suzhou cable	DTV broadcast and itv	Tianbai (Hong Kong)	April 2001
CCTV	Interactive sports	NDS	September 2001
	Interactive football match	OpenTV	June 2002
	Pay TV	NDS	October 2003
Sichuan cable	DTV, EPG, Datacasting	NDS	May 2002
Shanghai cable	EPG, digital TV, NVOD, interactive sports, datacasting,	OpenTV	October 2002
Guangdong cable	DTV, EPG, etc.	LiberateTV	March 2003
Zhejiang Cable	Digital TV, EPG, VOD	NDS	October 2003

Microsoft's Venus Project

Microsoft “transplanted” Web television from the United States into China in March 1999 when Bill Gates personally introduced the project in Shenzhen, a special economics region in Southern China. Called the “Venus Project,” Microsoft sought to promote the WinCE system, which supported internet surfing via television sets or other so-called information electronic appliances, instead of personal computers (Microsoft, 1999; Huang, 1999).

After the failure of WebTV, Microsoft has customized their interactive television solution called Broadband TV in China since 2001. It provided the video-on-demand (VOD) services through IP network (Microsoft, 2002).

High Definition Television (HDTV)

The tentative initial HDTV broadcast was conducted at the ceremony of the People's Republic of China's 50th National Day on October 1, 1999. Afterwards, Shenzhen City of Guangdong Province carried out test digital television broadcast in 2000, with the aim of terminating of the analog television broadcasting signal before 2005 (Xu, 2000).

Suzhou, one of the cities adjacent to Shanghai in Jiangsu Province, started tentative digital TV broadcast in April 2001. It is reported that there were nearly 20,000 subscribers (Digital Video Network, 2003).

Qingdao, the partner city of 2008 Beijing Olympic Games, commenced the HDTV broadcast in September 2001 (Administration of Radio Film and Television of Qingdao, 2003).

China Central Television (CCTV) broadcast interactive sports during the 9th National Sports Games in Guangdong Province in September 2001, by collaborating with News Corporation's NDS via the 13 provincial cable networks. This new CCTV interactive television service is called CCTVS_i. Again in January 2002, CCTV provided interactive sports programs through its interactive TV channel during the “Australian Tennis Cup.” In 2002, CCTV provided the interactive television service during the 2002 World Cup

Soccer Games in 19 provinces and 66 cities, by collaborating with OpenTV (NDS, 2003; OpenTV, 2003).

Sichuan Cable Corporation, which has more than 7 million cable subscribers, conducted digital TV broadcast test, by collaborating with NDS in May 2002 (NDS, 2003).

Shanghai Interactive TV Corporation introduced the first interactive television service in Shanghai, which has the largest number of cable subscribers (more than 35 million subscribers) in October 2002. The system is integrated by OpenTV. The experimental service provided services, such as electronic publishing guide (EPG), digital television program converted from analog programs, near video-on-demand (NVOD), interactive sports, digital music, datacasting, game, etc. (Administration of Radio Film and Television of Shanghai, 2003).

Guangdong test digital television broadcast in March 2003, with the collaboration of LiberateTV. It is reported that there were more than 20,000 subscribers of digital television. (GDVNET, 2003)

Besides, Nanjing, Hubei, Henan, Guizhou, Chongqing, Shandong, are said to be testing digital television broadcast. Their common problem is that they lack adequate construction and reconstruction funds (CEIC, 2003).

At present, many cable television companies provided the internet access service called "Cable Connection" (access internet via personal computer plus cable modem) and stock information service (there are aggregated 58 million stockholders in China by the end of 2002) through the HFC+IP model (SCN, 2002; Yangfan, 2001).

These experiments show that many experiments are going on in various parts of China to prepare for the adoption of digital television in China.

Concluding Remarks

The digital television industry in China looks promising, or even over-heated, despite that there are only few actual subscribers. When will digital television be a reality? Should its development be content driven or vice versa? This is really a chicken and egg question. China originally has a timetable, but the technical standard issue has put the time table on hold. The technical standard has so much at stake economically that its decision will be eagerly waiting by the whole world.

References

ATSC (2004), "About ATSC", available:<http://atsc.org/aboutatsc.html>

BBC Monitoring. (2002, November 9). "China to see Large Media Groups in Coming Five Years—Media Chief." Global News Wire - Asia Africa Intelligence Wire.

CEA, "Digital America", available:
http://www.ce.org/publications/books_references/digital_america/video/dtv_inroads.asp,

visited in 2003.

CEA. (2000, September). "New Digital TV Definitions for Consumers", available: http://www.digitalaudioguide.com/news/090400_dtv.htm, visited in 2003

CEIC. (2003). "Shandong Cable TV Will Commence Digital TV in October", available: <http://www.ceic.gov.cn/detail?record=1&channelid=56&presearchword=ID=102482>

China National Tourism Administration. (2003). "The Statistics communiqué of Hotels above Stars Rating in 2002", available: <http://www.cnta.com/32-lydy/2003/2002fdgb.htm>

CIA (2003), "The World Fact book 2003", available: <http://www.cia.gov/cia/publications/factbook>

DVB (2004), "About DVB", available: <http://www.dvb.org/index.php?id=9&PHPSESSID=6cf9a72acb78a2743a93f1acc774288b>

Huang Wei. (1999). "Can HDTV enter into Chinese market?" (HDTV Keyi Jinru Zhongguo Shichang Ma?), Technology Monthly of China (Zhongguo Keji Yuekan), No.12, pp.32-33

Jia Yubin. (2003). "Statistical Analysis of Chinese Advertising Industry, 2002" (Zhongguo Guanggaoye TongjiShuju Fenxi, 2002), Modern Advertising (Xiandai Guanggao), Vol.82, No.4, pp-16-18

Kang Songshi. (1994). "Analysis of the Development Strategy of EDTV and HDTV in China" (EDTV He HDTV Zai Zhongguo De Fazhan Celue Fenxi), Broadcasting and TV Engineer (Guangbo Dianshi Jishu), Vol.21, No.1, pp42-45

Microsoft (1999), "Venus Brings the Power of the Internet to Millions of Chinese Households", available: <http://www.microsoft.com/billgates/speeches/03-11venus.asp>

Microsoft (2002), "Microsoft Broadband TV", available <http://www.microsoft.com/china/tv/products/broadband.asp>

National Bureau of Statistics (2003), "The Statistics Data", available: <http://www.stats.gov.cn/tjsj/index.htm>

NDS (2003), "Press Releases 2003", available: http://www.nds.com/press_room/news_archive_2003.html

OpenTV (2003), "2003 Press Releases", available: <http://www.opentv.com/company/news/press-releases/2003/press2003.html>

State Administration of Radio Film and Television. (2003). "The Transitional Timetable of Digitization for Cable TV in China", available:<http://www.sarft.gov.cn/page/szds/gdsjb.htm>, visited in 2003

Wang Dexiu. (2000). "HDTV Will Dominate Market superseding the analog TV", Modern Electronic Technology (Xiandai Dianzi Keji), Vol.119, No.12, pp34-36

Xu Kangxing. (2000). "Consideration on the National Day's Project-HDTV receiver" (GuoqingXiangmu HDTV Jieshouji De Sheji Kaolv), TV Technology (Dianshi Jishu), Vol.216, No.6, pp.3-4

Yangfan. (2001). "Serious Thinking on Chinese Stock Market", available: <http://news.mlcool.com/mlcool/html/ns001188.htm>

Zhang Haitao. (2001). "The Total Goal And Key Tasks Of Broadcasting And Film Industry From The 10th Five Year Plan To 2010" (Cong Shiwu Jihua Dao 2010 Guangboyingshihangye De Zongti Mubiao He Zhuyao Renwu), The Academic Journal of Radio and TV of China (Zhongguo Guangbo Dianshi Xuekan), No.1, pp.7-10

Zhao, Wang. (1995). "Radio & TV Encyclopedia of China & Rest of the World", Beijing: Radio & TV Publishing House of China

Wang Jianlu, Su Dongming. (2002). "The application of HDTV broadcast (HDTV De Yingyong Shijian)", International Broadcasting Television (Guoji Dianshi Guangbo), Vol.16, No.4, pp.81-82

Appendix I

The Chronology of Digital Television Timetable in China

Cable TV

2003-Broadcast more than 10 channels that carry pay digital TV and some cable digital TV programs.

2003-Develop 1 million Set-Top-Box subscribers, and pay digital TV channels reach 50-80; cable digital TV programs reach 150 channels.

2005-Set-Top-Box subscribers reach 30 millions. Digital cable TV subscribers exceed 30 millions.

2010-Cable TV fully fulfills the digitization.

2015-Analog broadcasting terminates completely.

Terrestrial TV

2005-Above the provincial TV and radio stations realize digitization in the studio.

2008-All broadcast in 2008 Beijing Olympic Games must be HDTV.

2010-Almost realize digitization of production, broadcast, transmission, emission and reception.

2015-Terminate broadcast of analog signal.

Satellite TV

2005-It's said Chinese government begins to consider the project of DBS, and hope to cultivate 25 million subscribers.