Development Trend of Digital City in China

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Outline

1. Brief Introduction of MIIT & CATR
2. General Aspects of Chinese Telecom Industry
3. From Digital City to Wireless City
4. Development Status and Trend of Wireless City
From MII to MIIT

- March, 2008. The Ministry of Industry and Information Technology (MIIT) was founded.
- The new established MIIT integrated the function of:
  - The industrial management of the National Development and Reform Commission (NDRC)
  - The function of the State Administration of Science Technology and Industry for National Defense (SASTIND, except for the function of nuclear power management)
  - The function of Ministry of Information Industry
  - The function of the Informatization Office of the State Council (SCITO)

\[
\text{MIIT} = \text{MII+ SCITO+ SASTIND+ Partial of NDRC}
\]
MIIT, Regulator Vs Policy Maker

◆ The main functions of MIIT include
  - To formulate and implement industrial planning, policies and standards, monitor the daily operation of industrial sectors
  - To promote the development of key technical equipments and independent innovation, administrate the communication industry
  - To lead and promote the construction of Informatization and protect national information security

◆ As the industrial administrator, the main task of MIIT is:
  - To establish planning, policies and standards
  - To guide the industrial development
    - It will not intervene in the manufacture and operation of enterprises so as to ensure their main body status in the market.

◆ With the establishment of MIIT, The pace to take a new path of industrialization was accelerated
History - China Academy of Telecommunication Research

◆ Founded in 1956 -- China Academy of Posts & Telecommunication
◆ Before 1997
  – A research institution of MPT, the government and the monopolizing operator as well in China at that time;
  – Responsible for
    • Technical support to telecom operation;
      – Designing and planning telecom networks nationwide in China;
      – Telecom technical standards;
    • Advisory research in economy and policy field for the government;
    • Telecom system and equipment testing and certification;
◆ Today
  – A state owned advisory research organization; Working for:
    • Strategy and policy research and consulting for Chinese government
    • Consulting services to industries;
    • Research on telecom technical standards;
    • ICT system and equipment testing and certification;
  – 5 Institutes and 1 testing lab group in Beijing, 3 local branches in Shanghai, Shenzhen, and Chongqing
  – Over 1400 employees
What we have done

◆ There are more than 1,400 staff, with 85% in research and technical staff. This is a telecom research team with rational knowledge structure, optimized age structure, high academic level and rich experience.

◆ Many experts from CATR are chairmen and speakers in ITU study groups and working groups, and play important roles in the fields of 3G, mobile data service, IP and optical communications.

◆ CATR has set up long-term cooperation with famous telecom manufacturers and operators as well as test organizations in the world. Only in 2009 two EU regulators (OFCOM, CMT) have joined this army.
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Market statistics in 2008

By the end of 2008, the fixed line subs have reached 349mn, with the penetration rate as 25.8%.

By the end of 2008, the mobile subs have reached 642mn, which yields 49% penetration.

The total revenue reached 814bn, almost doubled than five years ago.

The revenue growth rate of the three operators in 2008 is decreasing.
Broadband grows steadily, xDSL still dominant

- In 2008, broadband users has surpassed 80 millions, while by the end of Oct 2009, 100 million BB subs have been born.
- During 2002 to 2007, the average growth rate of Broadband users in China is 82.8%.
- xDSL is the mainstream access technology. In 2009, The xDSL proportion is still over 80%.
Fixed line business will accelerate to decline

- With the acceleration of the substitution of the mobile, more customers would abandon their fixed line;

Mobile business is half way to maturate

- Mobile penetration rate has reached 50%
- 14 cities’ mobile penetration rate have been over 50%; Beijing and Shanghai’s penetration rate have been over 100%
- The average penetration of the East is 68%; 39.3% for the North; 38.8% for the central.

Broadband is about to take off

- The penetration of broadband is still quite low; the population penetration is below 10%. This figure is especially low in the rural area;
- The price of PC is declining;

Value-added service is still complementary

- According to international experience, Voice service is the dominant service in 3G era
The restructuring and the issuance of 3G license is the signal that China telecom industry has entered the integrated service and 3G era.
3G Commercialization Leads to Sharp Rise in Investment

Sharp Rise in CAPEX number

ROI has been raised

Source: CATR, 2009 STUDY REPORT
Global Standardization Involvement

China standardization activities

- ITU-T/R/D
- 3GPP/3GPP2
- OMA
- DSL Forum
- IEEE
- CJK
- SDOs (e.g. ETSI, APT)
- GSC
- IETF
- SDOs (e.g. ETSI, APT)
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Digital City has been broadly applied in China

A Symbol of city informatization, Gvt as an sponsor

New city management system make things easier!

Source: CATR, 2009 STUDY REPORT
Public Service Dominated the provision of digital city

Traditional Operators have not been active in the building of digital city

Huge investment
Demand

Difficult to be paid back

Users is not trained to pay for digital city service

Source: CATR, 2009 STUDY REPORT
The Birth of Wireless City: 2 key reasons

1. Wi-Fi technology's maturity and widespread deployment
   - Eliminate digital divide
   - Service the public
   - Improve urban informatization

2. Lowered门槛 to operate broadband wireless access networks
   - Global wireless cities begin to develop
全球有接近600个城市已经或准备建设“无线城市”，其中半数以上在美国。现在欧洲、亚太乃至一些发展中国家的“无线城市”也开始逐渐增多。

美国是全球拥有“无线城市”最多的国家，截至2007年3月，已经有176个“无线城市”，并且有164个城市准备或计划建设“无线城市”。

尽管无线城市在全球各大城市都开始得到应用，但目前还没有看到一个可以盈利的案例，其未来发展前景不明朗。

自2007年下半年开始，美国无线城市发展出现倒退现象，很多无线城市还因资金不足被迫关闭。
有两种覆盖方式，一种是广覆盖，但覆盖深度有限，如中国台北；另一种是深层覆盖，但覆盖范围相对有限，如美国费城。

案例一：中国台北
- 开始时间：2004年
- 用户数：30万
- AP数量：4000多个
- 覆盖范围：134平方公里
- 效果：覆盖效果差，用户体验不佳

案例二：美国费城
- 开始时间：2005年
- 用户数：总用户5053个，其中908个付费用户
- AP数量：42个AP/平方英里
- 覆盖范围：15平方英里
- 效果：远远超出预算，2008年5月该项目宣布终止。

表：中国台北无线城市覆盖情况

<table>
<thead>
<tr>
<th></th>
<th>完成时间</th>
<th>主要范围</th>
<th>累计人口覆盖率</th>
<th>AP数</th>
</tr>
</thead>
<tbody>
<tr>
<td>第一期</td>
<td>2004/9/7</td>
<td>30个捷运站及其周边150公尺。</td>
<td>20% （约52万人）</td>
<td>507</td>
</tr>
<tr>
<td></td>
<td>2005/1/31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>第二期</td>
<td>2005/2/1</td>
<td>剩余捷运站及市中心区域（约28.2平方公里）。</td>
<td>50% （约130万人）</td>
<td>2,020</td>
</tr>
<tr>
<td></td>
<td>2005/12/31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>第三期</td>
<td>2006/1/1</td>
<td>臺北市各行政区人口密集区 （约134平方公里）。</td>
<td>90% （约236万人）</td>
<td>4,000</td>
</tr>
<tr>
<td></td>
<td>2006/7/31</td>
<td></td>
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</tbody>
</table>
Four Business Models in the operation of Wireless City

ISP Model

Definition: ISP (including traditional operators) build or jointly build a wireless city network and operate it, then wholesale and retail the services to users, enterprises, and the government, so as to recover the investment.

Features:
- Government委托建网
- Profit and social welfare harmonized
- Rigorous regulatory system

Cases:
- China Taipei: Development has been less than ideal, with only 30,000 paying users by the end of 2007.
- No large user base or suitable profit model could be found.

Advertising Model

Definition: This model is a variation of the ISP model. It still relies on the ISP to build and operate the network, but it can provide free services to ordinary citizens with lower bandwidth. It supports free services through advertising, and also wholesale high-bandwidth, high-quality services to enterprises, groups, and the government.

Features:
- Government招标, ISP出资建网
- Free and paid services coexist. Free users must accept a large number of advertisements.
- Advertising revenue is crucial.

Cases:
- MetroFi: Previously one of the largest "wireless cities" ISPs, this company built and operated "wireless cities" in eight major US cities.
  - Model 1: Free broadband wireless access for citizens and tourists, and no need for government funding. The network operation and profit mainly come from advertising. Users who do not accept advertising interference can pay $19.95 per month.
  - Model 2: Provides multiple services to the government, with government funding.

Note: Advertising cannot sustain the network's运转, in June 2008, the company announced the closure of all wireless city networks in the US.
Four Business Models in the operation of Wireless City

**Government Dominated Model**

- **Definition:** A model where the government is responsible for planning, investing, and building the Wi-Fi city project. After the network is built, the government establishes a dedicated institution to handle maintenance and operation. The application mainly involves government industry applications, providing free wireless internet access for residents and renting part of the network resources to ISPs for commercial operation to recover costs and maintain network operations.

- **Features:**
  - The government can fully control the network's use and operating model.
  - Initially mainly for private networks, but with network expansion, some public services may be provided.

- **Issues:**
  - The government bears the investment risk.
  - It faces complaints from the telecom industry.

- **Case:** Hong Kong WiFi通
  - The government plans to invest $2 billion in Hong Kong, providing free services to residents, while the service provider (PCCW-HKT Network Services) only承接 network construction and operation.
  - The coverage area is mainly places closely related to public welfare, distinguishing from operators.
  - The initialization of the wireless city project by Hong Kong government also encountered opposition from operators.

**Cooperative Model**

- **Definition:** The core is to mobilize all those who own Wi-Fi AP devices and broadband access resources, opening up their own resources through the加盟方式 and connecting public and private-owned Wi-Fi networks to form a virtual "Wi-Fi Community", achieving a wireless city through this decentralized approach.

- **Features:**
  - Profit model: Non-joiners pay fees, joiners can get分成.
  - Technology implementation: Requires non-participants to buy specific APs or install software supporting the wireless community.
  -充分利用于整个社会闲置的带宽资源.

- **Issues:**
  - Hotspots quality varies significantly.
  - Difficulty in controlling network traffic and security.
  - Software download and installation channels are not smooth.
  - Concept炒作:打着免费幌子的变相ISP行为.

- **Case:** FON
  - This mode was the industry's focus from 2006 to 2007, but by 2008, the热潮 gradually subsided.

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ISP model has the most brilliant future, while government dominated model has the least.
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More than 10 cities in China are preparing for Wireless City

建设阶段一
初期概念或试点
政府基本上没有倾向意见，仅有宏观规划，或没有规划目标；或者仅有少量试点，没有明确思路。

南京 深圳 长沙
天津 重庆 大连

建设阶段三
建设中期阶段
开始一期建设，可以提供业务。

北京 杭州 上海

建设阶段二
开始实施阶段
有明确的市场需求，已经选定覆盖地点，选定运营商主体，即将实施或正在实施。政府和运营商界面清晰。

广州 青岛 武汉

建设阶段四
成熟阶段
网络形成一定规模，可以规模提供业务，业务开展较好。

厦门
TD-SCDMA has been chosen to build up Wireless City

It proves that TD can be relied

- 2008年8月22日，厦门市人民政府第41次常务会议审议并通过了使用TD-SCDMA/HSDPA技术建设“无线城市”的决议。
- 2008年8月28日，厦门市人民政府与中国移动福建公司签订了“无线城市”合作备忘录。
- 2008年9月8日，厦门“无线城市”项目在会展中心正式开通。

定位：“无线政务”、“无线产业”、“无线生活”

业务：城市工地噪音远程监控、移动城管监控、无线港口、公共交通监控、应急指挥视频通信、市民健康系统、掌上110服务等应用。

门户网站已经有43家政府部门一级网站接入，涵盖了市政府、公安、旅游、人事、医疗、海洋渔业等部门。
Five Main Characteristics for Chinese Wireless City

ISP model has the most brilliant future, while government dominated model has the least

- Government drives for competitiveness
- Wimax+ Wlan picked as main technology, TD rise to be partner.
- Social providers act as leading role, telecos are realizing to join this contest.
- The first application is to provide free public information. ISP service can be provided in charge.
- No clear business model can be found to be successful.

“无线城市”主要是指以满足地方政府信息化需求为出发点，利用宽带无线通信技术所构建的覆盖城市主要地区的通信网络，为政府、企业、公众提供信息化服务。

1. 无线城市目标是满足地方政府的信息化。提供的业务以政府和行业应用为主，应用场景多样，例如视频监控、移动监控、信息化应用等。
2. 无线城市建设方式可以分为两种：依托公网，或者新建。
3. 依托公网的无线城市一般由基础运营商承建，采用蜂窝移动通信技术、WLAN接入等。
4. 新建网络一般由新兴运营商承建，采用WLAN、固定无线接入技术、宽带无线接入技术。覆盖以区域覆盖为主，不以追求城市区域内的无缝覆盖以及跨城市漫游为目标。
Development Trend for Wireless City

Technology should be combined with urgent demand

政府需求？
- 行业应用：视频监控、移动监控、智能交通、公交站牌
- 政府应用（公益性）：免费公共区域接入、免费访问政府网站
- 应急通信

什么样的技术可以满足需求？
- WLAN：室内覆盖为主，频段易受干扰。
- 固定WiMAX：产业规模有限，仅面向固定
- 移动WiMAX：无许可频率，带宽可以满足需求，现阶段产业规模有限。
- 3G（以TD为例）：HSDPA可达2.8M，HSUPA可达2.2M，面向语音和数据业务。
- LTE：未来可以满足需求。

政府有信息化需求，但仍需进行资源整合和统一平台建设。

现阶段，单一技术难以满足需求。推荐技术方向：以蜂窝为主，WLAN为辅。
Development Trend for Wireless City

Subs should be developed to the public

无线城市建设主体？

- 建设费用：无线接入网络建设费用、光纤建设或租用费用、核心网建设费用、机房费用等。
- 运营维护费用：互联网结算费用、专业运维队伍、电力消耗、设备升级及损耗、广告营业费用。
- 网络覆盖必须达到一定规模。

商业模式？

- 广告模式和合作社模式在国外已经被证明无法持续发展。
- 国内无线城市以ISP模式为主，但盈利模式不清晰。
- 国内市政府以及行业用户的需求不明确。

非基础运营商难以生存。杭州华数现象例外。

仅依靠政府和行业用户难以支撑网络运营，网络必将面向公众用户。
Wireless city can be considered as emerging service.

Development Trend for Wireless City

- From the current development of wireless cities, the existing telecom service providers may face some challenges due to the development of new services.
- Wireless cities can be seen as an opportunity for new entrants, especially for those with an IT background, but the market is still evolving.
- In the long term, new entrants may try to enter the market through various means, such as offering free or low-cost services.
Possible Proposals to push forward wireless city.

- Developed to emphasize the importance of wireless technology in urban environments.
- Strong backing for the development of advanced mobile networks.
- Promising technology that can enhance city connectivity.

### Table: Features Comparison

<table>
<thead>
<tr>
<th>Feature</th>
<th>WLAN</th>
<th>IEEE 802.16-2004</th>
<th>IEEE 802.16e-2005</th>
<th>TD-SCDMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>2.4GHz / 5GHz</td>
<td>3.5GHz</td>
<td>2.5GHz</td>
<td>1880-1920MHz</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>23MHz</td>
<td>3.5MHz / 7MHz</td>
<td>5MHz</td>
<td>1.6MHz</td>
</tr>
<tr>
<td>Dual mode</td>
<td>TDD</td>
<td>FDD</td>
<td>TDD</td>
<td>TDD</td>
</tr>
<tr>
<td>User Speed</td>
<td>54Mbps (effective speed ~ 30M)</td>
<td>108Mbps</td>
<td>15Mbps</td>
<td>HSDPA (reach up to 2.8M/s, HSUPA (reach up to 2.2M/s)</td>
</tr>
<tr>
<td>Coverage</td>
<td>2km (depending on the density)</td>
<td>15km</td>
<td>15km</td>
<td>3km ~ 5km (2G/3G)</td>
</tr>
<tr>
<td>Scalability</td>
<td>Fully scalable, high terminal density</td>
<td>Full coverage, scalable</td>
<td>Full coverage, scalable</td>
<td>Full coverage, scalable</td>
</tr>
<tr>
<td>Application</td>
<td>Voice, video, data services</td>
<td>Voice, video, data services</td>
<td>Voice, video, data services</td>
<td>Voice, video, data services</td>
</tr>
</tbody>
</table>

### Further Recommendations
- Encourage local governments to collaborate on infrastructure projects.
- Fostering partnerships between the public and private sectors.
- Developing eco-friendly and sustainable solutions.
- Promoting innovation and fostering the growth of start-ups.

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The End—Q and A?

Any Reviews Welcome