

What Factors are Driving China's Mobile Diffusion?

By: [Nir Kshetri](#) and Maggie Kei Cheung

Kshetri, Nir and Maggie Kei Cheung (2002), "What Factors are Driving China's Mobile Diffusion?," *Electronic Markets*, 12(1), 22-6

Made available courtesy of Springer Verlag: The original publication is available at <http://www.springerlink.com>

*****Reprinted with permission. No further reproduction is authorized without written permission from Springer Verlag. This version of the document is not the version of record. Figures and/or pictures may be missing from this format of the document.*****

Abstract:

This paper identifies and analyses the forces influencing the rapid mobile diffusion in China. The analysis indicates that major factors influencing the hyperbolic growth rate of mobile technology penetration in China include the influence of Marxist labour theory, post-Mao reform resulting in market openness and heavy FDI inflow, rapid economic growth, reengineering of the telecommunication sector leading to fierce competition, China's interest in WTO membership and the development in mobile technologies. Some of the causes are unique to mobile diffusion while others are also applicable to telecom diffusion and ICT diffusion in general. The causes are highly interactive and hence their impact on mobile diffusion cannot be individually analysed and assessed. As a consequence, it is difficult to copy the Chinese examples in other developing countries. Some 'exportable' factors that influence rapid mobile diffusion in China include heavy investment in the telecom sector, government initiatives to encourage people to buy mobile phones and intense competition in, and reengineering of, the telecom sector.

Keywords: China, mobile technology, diffusion, Marxism, reengineering

Article:

INTRODUCTION

The number of mobile subscribers in China grew from 1.6 million in 1995 (ITU 2000) to more than 100 million in mid-2001 (Stout 2001). Between 1995 and 1998, China, a lower middle-income country, experienced higher mobile growth rate than the average of lower middle-income countries as well as the world average (Table 1). The Chinese mobile market became the largest in the Asia Pacific area in 2000 and will become the largest in the world by 2002 (Stout 2001). It is estimated that in 2003, China will account for more than 23% of the 700 million mobile phones then available in the world (USA Today 1999). Another estimate suggests that there will be 250 million mobile phones in China by 2005 of which 50% will have Internet access (Niitamo 2000). Mobile penetration rates in larger cities are much higher than the national average. In 1999, 78% of the population owned cellular phones in the three wealthy cities – Beijing, Shanghai and Guangzhou – (Tsuchiyama 1999), which compares with the national average of 3.42% that year (UNDP 2001). Mobile penetration will also overtake fixed-line penetration by the end of 2001 ([Ebusinessforum.com](#) 2000b).

The above statistics indicate that China is undergoing the mobile miracle. Since early adopters or so called 'innovators' of a new product come from those with high level of experience in similar product categories (Gatignon and Robertson 1985), a clearer understanding of the forces influencing the diffusion of information and communications technologies (ICTs) in general and telecom diffusion in particular would help to explain better the phenomenon of mobile diffusion in China. In fact, mobile diffusion can be viewed as a subset of telecom diffusion, which, in turn, is a subset of ICT diffusion. This paper attempts to explain mobile diffusion in China by considering the unique forces influencing it as well as the forces influencing its supersets (Figure 1).

The remainder of the paper is organized as follows. The following section briefly examines China's position

with respect to other countries in terms of ICT diffusion and the factors influencing the diffusion dynamics. Then we discuss the forces influencing the rapid growth of the Chinese telecom sector. Next, major forces unique to the diffusion of mobile technologies are analysed. Finally some conclusions are provided.

ICT DIFFUSION IN CHINA

In terms of the technology achievement index recently constructed by the UNDP (2001), China's rank of 45 (out of 72 economies considered) puts it in the group of 'dynamic adopters' of new technologies and ahead of other developing countries with higher per capita GDP such as Bolivia, Colombia, Peru, Paraguay, Jamaica and Tunisia. Likewise, China's high and medium technology contributed 39% of total exports in 1999 (UNDP 2001). Only a very few developing countries have the proportion higher than that of China.

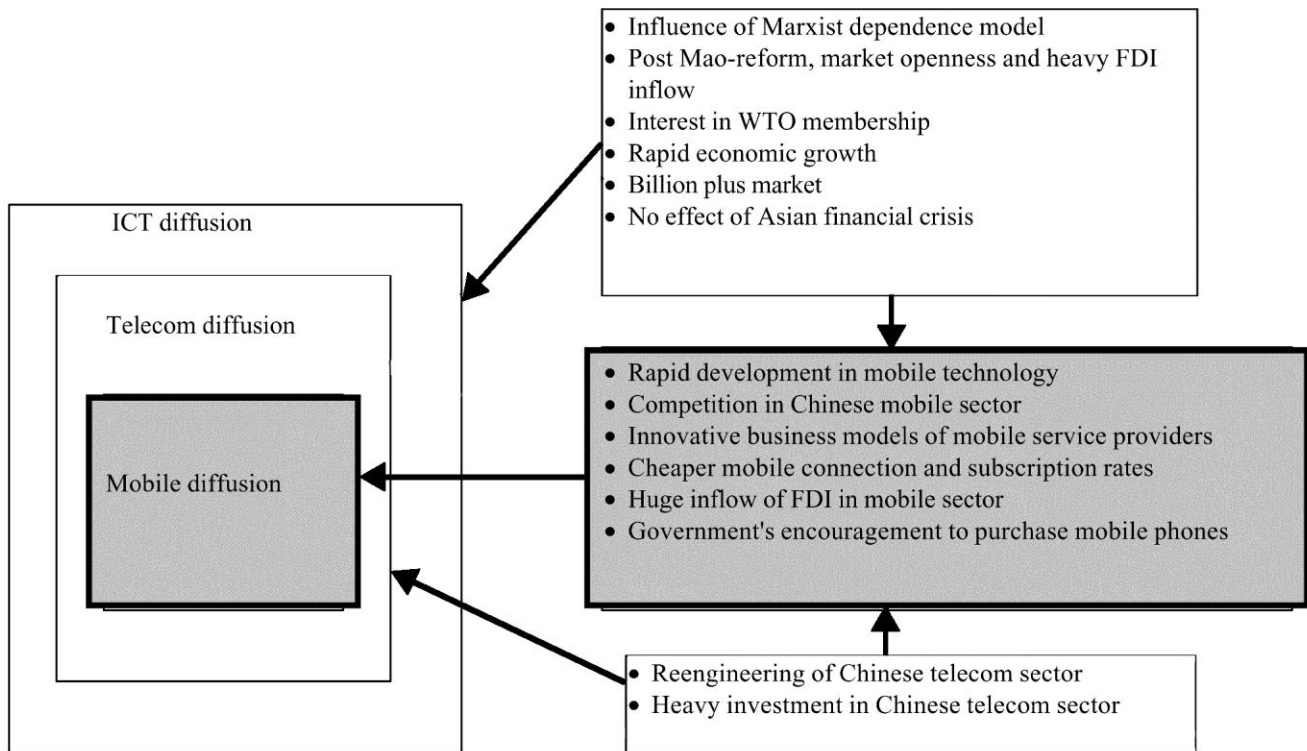


Figure 1. Factors Impacting the Diffusion of Mobile Technology in China

Table 1. A Comparison of Fixed and Mobile Network Penetration and Growth Rates in China

	<i>China</i>	<i>Lower-middle Income Countries</i>	<i>World</i>
<i>Mobile network</i>			
Number of subscribers, thousand (1998)	23863	35903.8	318892.9
Per 100 inhabitants	1.90	1.54	5.38
CAGR (%) 1995-98	87.3	76.3	52.1
<i>Fixed network</i>			
Number of lines, thousand (1998)	87420.9	190538.9	844031.9
Per 100 inhabitants	29	8.18	14.26
CAGR (%) 1995-98	26.4	16.3	6.9

Source: ITU, 1999

The Marxist dependency model strongly influenced the Chinese economic system in general and ICT diffusion in particular. Other developing countries import most of their ICT products whereas China manufactures them domestically. The solid domestic production base strongly interacted with the post-Mao reform. The reform facilitated the diffusion of technology and endorsed the concept of 'technology as a commodity', which led to

the formation of a large number of research institutes. By 1987, there were over 5,000 state-operated research units employing more than 230,000 scientists (Baark 1988). The transfer of technology from state-operated research units to industrial enterprises fuelled rapid technology diffusion. In the mid-1980s, the penetration rates of consumer durables in China were about the same as South Korea, Japan and the then USSR (Sklair 1994).

The reforms, compounded by China's billion plus market, attracted a huge inflow of foreign direct investment (FDI). The annual FDI inflow in China averaged \$11.7 billion between 1985 and 1995 and \$42 billion between 1996 and 1999, which compare with corresponding figures for India 0.45 billion and 2.7 billion respectively (UNCTAD 2000). FDI in China averaged 13.9% of gross fixed capital formation between 1996 and 1998, which is significantly higher than that of the world (8.1%) and developing countries average (10.1%) during that period (UNCTAD 2000).

Economic factors strongly influence the diffusion of ICT products. The Chinese economy grew by 7% annually in the 1980s and material consumption per capita increased by over 100% between 1978 and 1992 (Sklair 1994). Likewise, from 1992 to 1999, per capita GNP rose from US\$ 396 to US\$ 780, registering a compound annual growth rate of 4.6%. China, unlike other Asian countries, was not affected by the Asian financial crisis. It did not depreciate its currency and economic growth remained positive during and after the crisis. The economy's strong growth rate led to rapidly increasing consumer demand contributing to the achievements of the national technology policy.

China's interest in WTO membership is also fuelling ICT diffusion. Negotiations on China's terms of WTO membership were concluded in September 2001 and the text of the agreement is set to be adopted formally at the WTO Ministerial Conference in November 2001 (WTO 2001). Upon China's WTO accession, foreign telecom service suppliers will be permitted to establish joint ventures without quantitative restrictions in several cities with up to 25% foreign investment. Within three years the foreign investment limit will be increased to 49% and within five years there will be no geographic restrictions. China will also participate in the information technology agreement (ITA) and eliminate all tariffs on products such as computers, semiconductors, and telecommunications equipment (Wang 2000).

FORCES INFLUENCING TELECOM DIFFUSION

In the 1980s and 1990s, China invested heavily in the telecom sector. In the mid-1980s, investment in telecom infrastructure averaged about US\$ 300 million per year, or 30% of revenue, leading to an annual network growth of about 14% (Kelly 2000). In 1988 and 1989, investment doubled every year and fixed line grew accordingly. When the Chinese economy was experiencing inflation in the early 1990s, the government cut off investment in other sectors of the economy, but not in the telecom sector. During 1992 and 1993, investment was again doubled (Table 2) achieving telecom growth rates of 36 and 48% respectively (Kelly 2000). Telecom investment experienced similar growth rate levels during and after the Asian financial crisis. China's telecom investment in 1999 was about eight times as much as that of India (Euromonitor 2001).

The heavy investment was supplemented by a series of programmes designed to accelerate telecom development including extensive re-engineering of, and intense competition in, the mobile sector. China Unicom, formed in 1994, competes with the then-monopoly China Telecom and is licensed for mobile, paging, data, Internet and long-distance (James 2001). The two companies are already involved in a price war in the cellular market (Wilhelm 2000). China Mobile, China Unicom, and a number of Internet service and content providers are also forced to adapt to the rigorous disclosure requirements of the NYSE, NASDAQ, and Hong Kong's Growth Enterprise Market and to cut off redundant workers (McDaniels and Waterman 2000).

FORCES UNIQUE TO MOBILE DIFFUSION

The Chinese government is counting on the information economy to enhance its image. The Communist Party expects that a richer and more technology-orientated economy might help increase respect for it. The government also has the ambition of providing every household with a telephone. To achieve these objectives, top priority was given to build R&D capacity in mobile telephony in the late 1990s (Niitamo 2000). The

government is also promoting the mobile phone as the ‘people’s phone’ and is actively encouraging Chinese consumers in the cities and countryside to buy mobile phones.

The government’s economic reform and technology policy and the increase in the Chinese people’s purchasing power combined with the billion plus market have a magnetic attraction to global handset manufacturers and service providers. By the mid-1990s, several foreign companies were engaged in fierce competition in China. For instance, Motorola invested more than US\$1.2 billion in China between 1986 and 1998 in seven joint ventures and a wholly owned manufacturing unit (Tsuchiyama 1999). Motorola ceased making mobile phones in the US in 2001 and is moving a significant part of its production facilities in China to take benefit of the cheap labour. It will invest about US\$1.9 billion over the next two years in China (Drury 2001). Similarly, Nokia has eight joint ventures; a wholly owned manufacturing plant and an R&D centre in China. It invested more than US\$1 billion in the Chinese mobile market (BusinessWeek Online 2001). Its China operation has more than 5,000 employees, which contributed to 14% of its global sales in 1999. Likewise, multinationals such as AT&T, France Telecom, McCaw, NTT, and Siemens invested heavily in China’s nationwide mobile data network (James 2001).

Table 2. China’s Investment in Telecom Sector

<i>Year</i>	<i>Total Telecom Investment (\$Million)</i>	<i>Year</i>	<i>Total Telecom Investment (\$Million)</i>
1988	715	1995	11,917
1990	1,250	1996	10,955
1992	2,947	1997	12,738
1993	7,015	1998	18,124
1994	7,921	1999	23,497

Source: Calculated from Euromonitor (2001)

Table 3. A Comparison of Fixed and Mobile Charges in China and the World

	<i>China</i>	<i>Lower-middle Income Countries Average</i>	<i>World Average</i>
<i>Mobile network (1999)</i>			
Connection (\$)	60	90	86
Monthly subscription (\$)	6.04	20.99	21.40
Tariff per minute (peak) (\$)	0.05	0.25	0.27
Tariff per minute (off-peak) (\$)	0.05	0.18	0.18
100 minute basket (\$)	10.87	39.69	38.15
<i>Fixed network (1998)</i>			
Residential connection (\$)	226	133	109
Business connection (\$)	226	212	155
Residential monthly subscription (\$)	1.9	4.8	6.9
Business monthly subscription (\$)	2.9	8.8	11.5
Cost of 3 minute local call (\$)	0.01	0.05	0.09
Subscription as a % of GDP per capita	3.1	3.8	7.5

Source: ITU (1999)

Fierce competition in the mobile sector has resulted in low connection and subscription fees for mobile services. Monthly subscription rates as well as connection charges for mobile services in China are lower than the average of lower-middle income countries as well as the world (Table 3). Fixed line connection, on the other hand, is more expensive than both the averages. Competition and technological development have steeply reduced the costs of mobile phones. When cellular handsets were first introduced in China in 1994, the price was US\$850, which decreased to about US\$200 in 1999 (Tsuchiyama 1999). Similarly, the connection fee declined from US\$600 in 1994 (Tsuchiyama 1999) to US\$60 in 1999 (Table 3).

Innovations in mobile pricing such as the introduction of mobile pre-paid cards have been the major driving force for the rapid diffusion of mobile phones across the world. Mobile prepaid cards were introduced in China at the end of 1999 and are contributing to mobile growth rates.

Innovative business models of mobile companies have made mobile phones more attractive. For instance, GW Trade, a joint venture between China Equity Advisory and [GW.Com](http://www.gw.com), was established in 1999 to manage networks to buy and sell stocks online. By March 2000, 3,000 investors in Shanghai, and 100 in Shenzhen, were trading stocks over the paging networks managed by GW Trade. The average daily volume of 3,000 Shanghai users in early-2000 was US\$3.6 million, about 30 times as much as the average trading volume of [stockstar.com](http://www.stockstar.com), the largest Web-based stock trading company popular ([Ebusinessforum.com](http://www.ebusinessforum.com) 2000a). Through the 'netsets' of GW Trade, individuals can subscribe to a variety of information-on-demand services, from Internet access to stock quotes with a monthly service charge of about US\$5–10. Low PC penetration rate and relatively higher Internet access fees are the major factors making [GW.Com](http://www.gw.com)'s netset popular ([Ebusinessforum.com](http://www.ebusinessforum.com) 2000a).

DISCUSSION AND CONCLUSION

An important contribution of this paper is to identify and analyse the major factors accounting for China's transformation from a rural based economy into one of the leading mobile markets. The causes of mobile diffusion identified in this paper are not 'detachable, isolable, homogeneous, independently operative, and hence susceptible of being added to or subtracted from the causal complex' (MacIver 1964: 94). Put differently, they cannot be 'individually analysed and assessed' (Fischer 1970: 179). For instance, the post-Mao reform would not have contributed much to ICT diffusion if the economy had not been self-sufficient.

Rapid mobile diffusion in China is the result of the interaction of several factors mentioned above. Not all the factors can be exported to other developing countries. China's billion plus market, for instance, has a magnetic attraction to foreign investors, which cannot be 'exported' to smaller developing countries. Some exportable causes include heavy investment in telecommunications sector, government initiatives to encourage people to buy mobile phones and intense competition in and reengineering of telecom sector.

References

- Baark, E. (1988) 'The Value of Technology: a Survey of the Chinese Theoretical Debate and its Policy Implications', *Research Policy* 17(5), 269–82.
- BusinessWeek Online (2001) 'Nokia's China Strategy: Exchanging Technology for Market Access', 22 January, online at: <http://sg.us.biz.yahoo.com/bizwk/010122/g.html> [accessed 23 June 2001].
- Drury, G. (2001) 'Corporate Location's Top 50 Foreign Investors for 2001', *Corporate Location*, Mar/Apr, 35–8.
- [Ebusinessforum.com](http://www.ebusinessforum.com) (2000a) 'GW Trade: Serving a High-tech Niche in China', 23 March, online at: <http://www.ebusinessforum.com> [accessed 23 June 2001].
- [Ebusinessforum.com](http://www.ebusinessforum.com) (2000b) 'Doing Business in China', online at: <http://www.ebusinessforum.com> [accessed 23 June 2001].
- Euromonitor (2001) *International Marketing Data and Statistics*, London.
- Fischer, D.H. (1970) *Historians' Fallacies: Toward a Logic of Historical Thought*, New York: Harper & Row.
- Gatignon, H. and Robertson, T.S. (1985) 'A Propositional Inventory for New Diffusion Research', *Journal of Consumer Research* 11, 849–67.
- ITU (1999) *World Telecommunications Development Report*, Geneva: International Telecommunications Union.
- ITU (2000) *The Asia Pacific Region: A World of Opportunity*, Geneva: International Telecommunications Union.
- James, D. (2001) 'China's Sizzling Circuits', *Upside* 13(1), 60–7.
- Kelly, T. (2000) *If the Telecommunications Industry is So Successful, Why is It Unable to Reduce the Waiting List for Telephone Service?*, Geneva: International Telecommunications Union.
- McDaniels, I.K. and Waterman, J. (2000) 'WTO: a Done Deal?', *The China Business Review* 27(6), 22–7.

MacIver, R.M. (1964) *Social Causation*, New York: Ginn and Company.

Niitamo, V.-P. (2000) 'Making Information Accessible and Affordable For All', *Wider Angle*, August, online at: <http://www.wider.unu.edu/newsletter/angle2000-1.pdf> [accessed 20 July 2001].

Sklair, L. (1994) 'The Culture- Ideology of Consumerism in Urban China: Some Findings from a Survey in Shanghai', *Research in Consumer Behaviour* 7, 259–92.

Stout, K.L. (2001) 'China Mobile has Eyes Only for 2.5G', [CNN.Com](http://www.cnn.com), 5 June.

Tsuchiyama, R. (1999) 'The Cellular Industry in China: Politics, Rewards, and Risks', *Telecommunications Review*, 2nd quarter.

UNCTAD (2000) *World Investment Report 2000: Cross-border Mergers and Acquisitions and Development*, Geneva.

UNDP (2001) *Human Development Report 2000*, New York: United Nations Development Program, online at: <http://www.undp.org/hdr2001/completnew.pdf> [accessed 11 July 2001] .

USA Today (1999) 'Mobile Phone Growth Markets', 15 February.

Wang, S. (2000) 'The Social and Political Implications of China's WTO Membership', *Journal of Contemporary China* 9(25), 373–405.

Wilhelm, K. (2000) 'Mobile Muddle', *Far Eastern Economic Review*, 13 July.

WTO (2001) *WTO Successfully Concludes Negotiations on China's Entry*, 17 September, Geneva: World Trade Organisation, online at: http://www.wto.org/english/news_e/pres01_e/pr243_e.htm [accessed 30 September 2001].