"Contrary to many Information Age pundits and prognosticators, the working class continues to exist; indeed, in contemporary China, it is being reinvented on a gigantic scale and in a new historical form. ICTs, as Jack Linchuan Qiu shows, constitute a vital and fascinating component of this crucial process. Those who assert that class realities have nothing to do with cellphones and Internet services—and vice versa—will have to think again."

Dan Schiller, Graduate School of Library and Information Science, University of Illinois Champaign-Urbana

"Jack Linchuan Qiu has written the most insightful, empirically grounded account to date of the social role that the Internet and related information and communication technologies have played in the course of China's rapid economic development. Anyone with an interest in the social and economic implications of the Internet in developing economies—whose citizens make up half of today's Internet users—should read this book."

William H. Dutton, Director, Oxford Internet Institute, University of Oxford
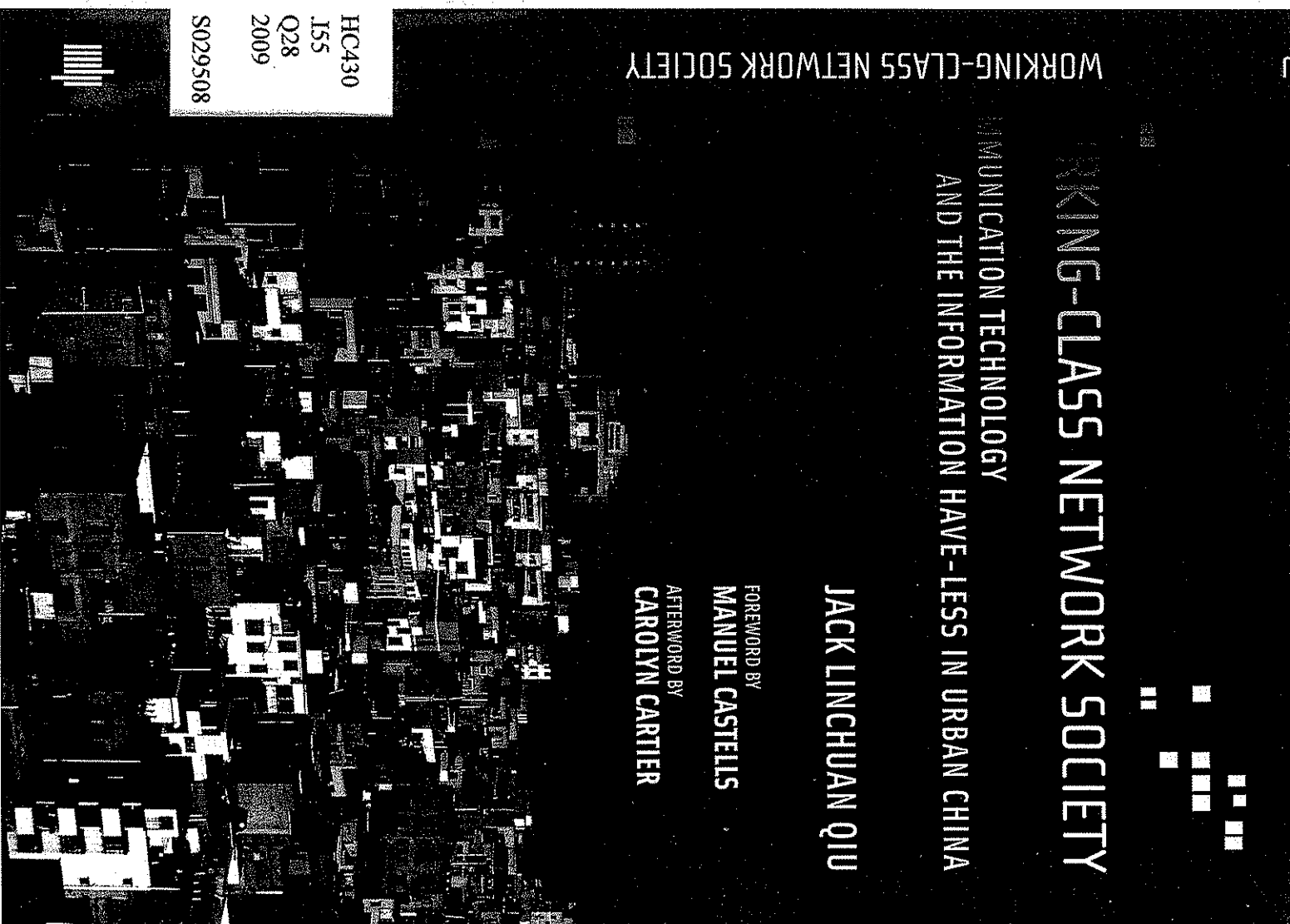
WORKING-CLASS NETWORK SOCIETY

KING-CLASS NETWORK SOCIETY

COMMUNICATION TECHNOLOGY
AND THE INFORMATION HAVE-LESS IN URBAN CHINA

JACK LINCHUAN QIU
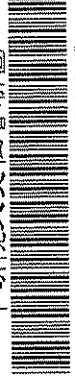
FOREWORD BY
MANUEL CASTELLS

AFTERWORD BY
CAROLYN CARTIER

Working-Class Network Society

Communication Technology and the Information Have-Less in Urban China

Jack Linchuan Qiu

Contents

information, and power. Furthermore, those who are not included in the networks are nonetheless defined in their existence by their exclusion and their drive to survive by creating alternative networks, be it the global criminal economy or networks of resistance to the dominant order.

The fact that the network society is global, bypassing in its dynamics the boundaries defined by the nation-state, is not tantamount to global social homogeneity. *The world is not flat.* The market is, but societies, cultures, and institutions that have been produced differentially by their historical and geographical specificity, by their identification in time and space, are not. Therefore, every society is at the same time a network society in its social structure and a specific network society in terms of its culture, institutions, and specific location in the international division of labor and in the world structure of power relationships. This is what a number of researchers from a variety of countries documented in the book I edited and coauthored in 2004, examining the network society in a cross-cultural perspective (Castells 2004). Jack Qiu takes this analysis one step further. He analyzes the specificity of the network society in China and proposes the concept of working-class network society. It may sound odd at first, as all innovative concepts do. But it becomes almost evident if we relate it to the usual vision that we have of China today. Most analysts agree that China is the manufacturing powerhouse of the planet in this early part of the century. What Western Europe was in the nineteenth century and the United States and Japan were in the twentieth century is China today: the industrial factory of the world. But this factory is networked to the entire global economy and is organized around the informational mode of development. It manufactures goods by incorporating information and knowledge into the labor process.

Thus, class divisions appear on the basis of differential access to and control of information processing tasks, ultimately embodied in differential access to information and communication technologies, at work and in life. The irony of history has located the largest exploited working class of the global information age in the last communist state inherited from the industrial era.

This book provides a systematic analytical framework to study both the differential dynamics of the global network society and the processes of new inequality and class formation in the context of informationalism. It relies on firsthand fieldwork research in China, documentary and statistical analysis, and a deep knowledge of the scholarly literature on global technological transformations. It opens a new path of inquiry that researchers and students around the world will follow. It also challenges us to think

normatively and to shake up our detachment when contemplating the sea of injustice and human suffering that characterizes a process of economic growth and technological innovation that probably dwarfs the human drama of previous industrializations. Professor Qiu takes us away from the blind technological optimism of vendors of the future and into the harsh territory of the exploitative and exclusionary information age.

Manuel Castells
Santa Monica, California
March 2008

Abbreviations

ARPU	Average revenue per user
BBS	Bulletin board system
CASS	Chinese Academy of Social Sciences
CCP	Chinese Communist Party
CNNIC	China Internet Network Information Center
DECT	Digital enhanced cordless telephone
FDI	Foreign direct investment
GDP	Gross domestic product
ICP	Internet content provider
ICT	Information and communication technologies
ILO	International Labor Organization
IPO	Initial public offering
ISP	Internet service provider
MCD	Mobile communication division
MEI	Ministry of Electronic Industry
MII	Ministry of Information Industry
MMORPG	Massively multiplayer online role-playing games
MPT	Ministry of Post and Telecommunications
MoC	Ministry of Culture
MoE	Ministry of Education
MoH	Ministry of Health
MPS	Ministry of Public Security
NGO	Nongovernmental organization
NIE	Newly industrialized economies
OS	Operating system
P2P	Peer-to-peer
PAS	Personal access system
PHS	Personal handyphone system
PRC	People's Republic of China

SARFT	State Administration for Radio, Film, and Television
SARS	Severe acute respiratory syndrome
SEZ	Special Economic Zone
SMS	Short messaging services
SOE	State-owned enterprises
Sysop	System operator
Telco	Telecommunications operator
VoIP	Voice over Internet protocol
WLL	Wireless local loop
WSIS	World Summit on Information Society
WTO	World Trade Organization

1 Introduction

The small connecting cogwheel which revolves quietly is among the most essential parts of the machine.

—Leo Tolstoy

Do information and communication technologies (ICTs) help the poor, or do they promote the interests of the rich? Do they reduce inequality, or make it more acute? In an examination of the uneven development of ICTs and their social consequences, we often immediately think about the digital divide, the great social division between the information haves and the information have-nots. But this is a binary mode of thinking that simplifies things, people, and processes into two basic categories. We either have or do not have the gadget, the skill, or the access. There is either upward social mobility, or people would be "falling through the Net" (National Telecommunications and Information Administration 1995). Since the late 1990s, the concept of the digital divide has dominated many analytical accounts, policy debates, and planning documents (National Telecommunications and Information Administration 1999, 2000; Bolt and Crawford 2000; Norris 2001; Jung, Qiu, and Kim 2001; Murelli 2002). But is this all that is going on?

In summer 2002, I returned to China from the United States to conduct fieldwork. I had done some research on the digital divide and proposed a preliminary idea of informational stratification as a way to understand information inequality in China (Qiu 2002a). I traveled from China's coastal metropolitan areas to remote villages in the high mountains of the Southwest. I was in a high-tech exposition one day, amazed by the marvelous technologies offered to China's new rich; on another day, I set foot in a clay house with no windows, where people had no media access and could barely survive on potatoes.

2 Internet Cafés

When commercial Internet began in China in 1995, the Internet café was the center of action. "How far is China away from the Information Superhighway?" asked the most famous Internet advertisement of the time. "Go north, 1500 meters" (*China Youth Daily* 1997). A thick arrow was drawn pointing at one of the earliest cybercafés in the Zhongguancun area of Beijing, China's main IT hub. It was in this area, also in an Internet café, that in 1996 I got my first e-mail account. Set up by graduates from the Computer Science Department of Peking University, this place was conveniently located in the old *hutong* alleys outside the East Gate of the campus. There were about twenty terminals, of which nineteen used the UNIX system showing monotonous green texts. Only one had Netscape 1.1, and it cost a prohibitive hourly rate of twenty yuan ($2.40) to surf the Web.

To me and most of my fellow users, e-mail was the only activity. One of the shop owners taught me the commands and explained how they charged by the volume of international data flow. It was international because half of the customers were foreign exchange students, and everyone else, myself included, was applying for schools overseas. It was good business, as the delivery of international mail took at least one week and more than 4 yuan, whereas an e-mail took only a few minutes and less than half a yuan. The place was not fancy, but it was quiet and clean, with the smell of instant coffee floating in the air.

Since then, Internet café in China has gone through a remarkable metamorphosis. Enter an average cybercafé in 2008, and you are immediately surrounded by the dazzling colors and sounds of online gaming, streaming video, poster ads, and young people talking loudly to each other or to their microphones. Almost all computers are equipped with earphones and a microphone. People flock in not to pursue further studies, but to be entertained. It would be uncommon to see anyone checking e-mail and

even harder to find anyone retrieving foreign-language content. The coffee smell has been replaced by cigarette smoke. From time to time, you see people eat instant noodles or snooze in front of the monitor. Very few of them are trying to get out of the country. They barely want to get out of their seats.

The machines are also different. In the mid-1990s, computer terminals in Internet cafés were identical to personal computers (PCs) at home or at work in terms of hardware and software. A decade later, they evolved into a special-purpose appliance optimized for collective entertainment. From standardized headsets to heavy-duty waterproof keyboards, from the officially authorized operating system (OS) to the latest online gaming programs, these computers are well equipped, although they rarely have a USB harbor, a CD-ROM, or Word. They have become a particular species with their own technical design and service requirement that a full commercial plaza has emerged in Guangzhou specializing in cybercafé computers.

Even the Chinese phrase for Internet café has changed. Ten years ago, it was called wangluo kafeiwu, meaning literally "network coffee house," a place of enlightenment, culture, and taste for the brainy and foreign minded. Ten years later, it is known simply as wangba or "Net bar." The short term succinctly signifies the loss of its elite appeal and descent into a working-class ICT. Cybercafés have become a kind of inexpensive bar, where the information have-less kill time, relax and socialize, and get intoxicated in cyberspace and the physical place. A 2004 survey found that 91.4 percent of China's Net bars charged no more than 2 yuan (25 cents) for hourly access (China Youth Network 2004).

Nevertheless, a few things remain unchanged. Most customers—students as well as tourists and migrant workers—are young, and many of the café owners, like their customers, are male with relatively high levels of education by local standards. Their employees, particularly attendants in larger cafés, include more females, who tend to be young, less educated, and poorly paid; they work long hours, in almost complete silence.

For working-class network society, the Internet café offers a collective mode of access. It is an informational commons of exceptional value because a large number of potential Internet users in the country are either unable to afford their own PC (or unwilling to pay for it) and get their own Internet access (Murray 2003). This is not only a matter of income. It also requires domestic space and a relatively stable residence. Users also have to deal with Internet service providers (ISPs) and take care of maintaining and upgrading their computer. In contrast, the Net bar rents shared scarce ICT resources. It offers a cost-effective solution for members of the

information have-less to meet their informational needs, while building and extending working-class networks from the bottom up.

This is, however, a skewed market, where individual decisions in investment and sales, as well as the life prospects of the customers and staff, are constrained by larger structural forces. ISPs frown at the idea of sharing, just as phone companies turned away from party line service in early-twentieth-century North America (Martin 1991). Schools and upper-class communities dislike Net bars because thugs and criminals may hide there. There are indeed thieves and drug dealers, and a number of young people have vanished due to gang activities or fire. These events, publicized and dramatized by the mass media, cause nationwide public panic and a call for strict regulation by government in yet another process of arrogant elites silencing the information have-less.

It is against this backdrop that the market of Net bars coevolves with state regulation at national and local levels, while the technical design and business model of cybercafés are being upgraded and differentiated. The role of government intervention thus assumes vital importance beyond the model of Chinese developmental state due to the class dynamics concerning collective access. But how strong is the state when it comes to the technosocial emergence of grassroots networking? How tenacious is the grassroots networking that supports the working-class ICT service of cybercafé and wider social formations of network labor? Based on field observation, interview, and archive research, I examine these questions by providing an analytical overview of Internet cafés, their historical trajectory, internal differentiation, and implications for working-class network society.

The Defiant Upsurge

When an Internet café hits the headlines, it is almost always associated with at least one of the following terms: qingli (clean-up), daji (crackdown), guanbi (close-down), and zhengdun (rectify, or following official regulations). This has become a press routine, both in and outside the country, as revealed by these typical press accounts: between April and October 2001, 17,488 Net bars were closed nationwide (XinhuaNet 2001); in December 2002, another 3,300 were cracked down on (Associated Press 2002); between March and November 2004, 18,000 had their business suspended and 1,600 lost their licenses permanently (CCID Net 2004). This is, of course, not just objective news but stories magnified out of proportion, designed to create a chilling effect. Be they nationwide or local

of users going online from school was quite stable, from 19.7 percent at the beginning of 2001 and remaining at this level for several years, until it dipped to about 12 percent in 2007. Now, with more than one-third of China's Internet users going online from a shared informational service, the cybercafé has become the second most important, and the most rapidly growing, mode of Internet access in the country, serving have-less netizens on massive scale.

Another piece of evidence, which must be viewed with some caution, is the total number of Internet cafés in China. It is difficult to count these small businesses because many of them are illegal or semilegal, and available reports rarely explain how they came up with their estimates. A widely circulated official Xinhua article claims that the government had registered 110,000 Internet cafés in February 2003 (Xinhua News Agency 2003a). This figure was, however, reported at the end of a major rectification campaign that started just after a large cybercafé fire in Beijing in June 2002, when the total number was reported to be about 200,000 (L. Shen 2003).

More recently, it was reported that there were at least 1.8 million cybercafé outlets in China in October 2004, citing an MoC official (China Daily 2004), and more than 2 million of them in September 2005 (McLaughlin 2005). According to another official press release, this one in July 2006, China had 112,264 cybercafés, with more than 6 million computers and 786,000 employees (Guangming Daily 2006). The wide discrepancies in these estimates is not uncommon, as in other types of macrostatistics in the country, generated by unexplained methodology in the framework of a complicated bureaucratic system. However, the observation remains that the Internet café business is huge despite the restrictive regulatory regime.

This growth pattern flies in the face of suppressive policies and refutes the derogatory upper-class discourse that looks down on cybercafés as a doomed ghetto business. In so doing, it vehemently challenges the problematic commonsense that the joint efforts of the state and the upper classes would exert control over matters regarding ICTs—especially in this sphere of working-class technology that is now being claimed by the information have-less. As the high-end market gets saturated, the importance of Net bars as a collective mode of access becomes even more prominent as they continue to drive the expansion of Internet into the lower social strata of urban China, from low-income communities in major metropolitan areas to second- and third-tier cities and small towns in the hinterland. The question is how and why, over the course of a decade, this particular Internet access service has shown such an upsurge.

Selecting a Path

How did the Internet café evolve from an upper-class service, provided by and for the elite, to a working-class ICT? How did it become a crucial technosocial basis for the expansion of working-class networks among the information have-less? The process encompasses several transformations. First, the customer base of Internet cafés shifted from elites in the 1990s to the information have-less of the twenty-first century. Second, the main function changed from offering a two-way communication flow of information to the delivery of increasingly one-way entertainment. Third, the Internet café used to be a symbol of the new economy. But Net bars face a major public image crisis caused by the crackdown, stigmatization, and an increasing number of black Net-bars. Gone is the image of the Internet café as a place of enlightenment. Net bars are now widely perceived as a social problem in urban China.

These currents of devolution were not predestined. This path was not a matter of bad luck or a linear process of increasing regulation or a continuously expanding market. It in fact started as a set of messy forces interacting with events embedded in the social reality of the Chinese informational city, including street-corner societies in contemporary China, which are often misunderstood by the urban mainstream.[1]

Despite the apparent lack of order, we see a systemic trend of Internet cafés being locked in and forced into a downward spiral without other choices, especially since the key transitional period of 1999 to 2002. Alternative ways of technology shaping are suppressed, leaving Net bars under the dual pressures of political control and commercial survival. Some cybercafés have vanished. Others were left with no choice but to become what they are today.

We can construct four basic types of collective Internet access venues in China: (1) promotional cafés, (2) elite cafés, (3) mass-service Net bars, and (4) illegal or semilegal black Net bars, including unlicensed or partially licensed ones, many of which fail to have valid licenses due to uncontrollable reasons such as policy change and official discrimination against Net bars. We can find a notable example of each of these four types in the Haidian District of Beijing, in or near Zhongguancun, all within a short bike ride from the cybercafé where I got my first e-mail address. Unfortunately, none of these examples still exists. Financial reasons contributed to the decline of the first two. Urban reconstruction forced the third to relocate. The last was torched.

Table 2.1
Rates at Feiyu Net-Friend cybercafé (8.27 yuan = $1.00)

Service items	Time	Hourly rate
Internet access	7:00 A.M.–9:00 A.M.	Free of charge
	9:00 A.M.–noon	3–5 yuan
	Noon–2:00 A.M.	4–10 yuan
	2:00 A.M.–7:00 A.M.	3–5 yuan
Printing	1 yuan per page (A4 size)	
Photocoping	0.2 yuan per page (A4 size)	0.4 yuan per page (A3 size)
Scanning	4 yuan per page (A4 size)	

No other service charges
Drinking water provided for free
20 percent discount for VIP card and student ID card holders
Internet access charge calculated by the minute

Note: A4 and A3 are the commonly used printing paper sizes in China. A4 is 8.3 by 11.7 inches; A3 is 11.7 by 16.5 inches.

Feiyu also offered printing, scanning, and photocopying service, which is extremely rare in Net bars today, where word processors are scarce or even nonexistent. The provision of free drinking water and by-the-minute cost calculation is also rare today in China. In 2000, Feiyu asked its customers to pay after they finished going online, whereas standard operation today is to pay up front (H. Xin 2000a). Such seemingly small matters showed that Feiyu was not just another commercial IT company. More than anything else, it treated its have-less customers with respect.

Then in December 2000, more than two hundred police descended on Feiyu. In about two hours, they checked 860 computers and found "pornographic" content on 56 (6.5 percent) of them (H. Xin 2000b). The penalty included 10,000 yuan ($1,208). The mass media soon began to associate this prominent Net bar with the corruption of morals among youth. Peking University, which owned the land, reconsidered whether the Feiyu Net bar street should be allowed to continue to exist. In April 2001, four months after the police raid, Peking University cut Feiyu's electrical service in order to force it to relocate (*New Weekly* 2001). The new location provided by Peking University was at a nearby but less accessible

site in a high-rise building. It had more than 2,000 square meters for about 1,200 computers, as opposed to the previous setup of 6,000 square meters for 1,500 computers (Xiao 2001).

Feiyu has never recovered from the eviction. To prepare for similar "abrupt interruptions," Wang had to "diffuse risk" and "diversify" his business into dozens of small Net bars in ordinary residential communities in Beijing, each having 50 to 100 computers (Xiao 2001). Feiyu was thus transformed into a series of small-scale operations—and not by choice. Following the move, its daily revenue per computer plummeted from 74 yuan ($8.94) to 20 yuan ($2.42), a decline of 73 percent.[8] Feiyu suffered yet another police raid in February 2002. This time the penalty was more severe, including suspension of the business for three months (Wang and Zhang 2003).

Feiyu had been reshaped from a large entity dominating an entire street in Zhongguancun into a typical mass-service Net bar, consisting of a series of much smaller and lower-profile operations. Scaled down and scared off, it now had to let go its aspirations to serve diverse user groups including the less privileged. It had to focus on survival, like most other Net bars since this time.

Black Net Bars

Black Net bars (*heiwangba*) are Internet cafés that engage in "illegal" activities: they operate without a license or, more commonly, without one or a couple of the several officially required licenses. Even a fully licensed cybercafé can be labeled "black" if it admit minors under age sixteen. But since it is so easy to lose licenses and minors constitute such a major chunk of the cybercafé market, there is a frequent slippage in China's urban discourse between black Net bar and cybercafé in general, to the extent that the two are often regarded as synonyms.

By far the most notorious black Net bar is Lanjisu, located next to the University of Science and Technology, Beijing (USTB). It began operations in late May 2002, about three months after the February 2002 police raid on Feiyu. But just two weeks later, on June 16, Lanjisu was set on fire at 2:30 A.M. Earlier, the Net bar attendant had refused to admit two minors, aged thirteen and fourteen (Shanghai Oriental TV 2004). As revenge, the teenagers poured gasoline at the gate of the cybercafé and set it alight. Because the door was locked and the windows were bolted with metal bars, the fire killed twenty-five and injured thirteen. Among the dead, twenty-one were USTB students, nine of them from the same class majoring in computer science (Bai 2002).

censorship system (Barmé and Ye 1997). This was the case in one café I visited in January 2000, an operation owned by China Telecom Beijing. Although the practice had been around for a while, used by people searching for a range of unauthorized content from prodemocracy movements to gambling and pornography, the campaign against Falun Gong became the most powerful imperative to clamp down on the dissemination of "harmful" information through Net bars.

The authorities finally decided to intervene for political and economic reasons. In so doing, they initiated a domino effect that ultimately forced Net bar operators to cut back on the uses associated with this shared mode of ICT service. It was too risky to retain all the social and political functions of a cybercafé, from alternative speech to collective hacking. The same is true for organized efforts to include laid-off workers and retirees as well as other have-less groups, as happened at Feiyu.

Entertainment is, after all, the lowest denominator with significant market potential. Cast in narrowly defined commercial terms, as long as the market expands and café owners can make some money, the boundary between mass-service Net bars and black Net bars does not matter much. Hence, benign as some of the original intentions might have been, the suppressive policies created rather than solved the Net bar problem. Short-sighted decisions made for immediate troubleshooting turned out to accelerate the descent from elite to working-class ICT, which eventually hurt the long-term well-being of Internet cafés through its particular mode of disempowering devolution.

Upgrades

A key to the process of state intervention, and of artificially heightened competition caused by the involvement of state-sponsored corporations, is a discourse of linear progression, best captured by the term *upgrade*, by which we understand a technical expression that now assumes social, political, and cultural meaning under the technocratic system of contemporary China. Just as average PC users often need to upgrade hardware and software without knowing the exact content of the upgrades, at the policy level Net bar users and managers are seldom involved in deciding how to upgrade their collective places of access. Although cybercafés are often run by have-less entrepreneurs for have-less consumers in have-less communities, their fate nonetheless depends on elite decision makers, who care more about upgrades than the actual informational needs of the information have-less.

The discourse, policy, and practices of top-down upgrading have done serious harm to the booming cybercafé sector. "Open a Net bar, and kill yourself (*yaozisha, kaiwangba*)" is now the motto instead of its late-1990s version, "Open a Net bar, and be well-off (*yaoxiangfa, kaiwangba*)." But the puzzling question remains: Why, under such formidable circumstances, does the Internet café market continue to expand? Does this mean the upgrades somehow help cybercafés or that they were not powerful enough to stop Net bar growth? Does this suggest the upgrades may even produce opportunities for the information have-less to build new alliances and appropriate the logic of upgrading in unexpected ways?

Regulation and Resistance: National and Local

From 1998 to 2002, China issued three official directives regarding the operation of Internet cafés, with the measures of control becoming increasingly strict, for example, by requiring higher network security standards, closer cooperation with enforcement agencies, and more severe penalties for noncompliance (Qiu and Zhou 2005). During this period, the leadership role in the national regulatory regime shifted from the Ministry of Public Security (MPS) in 1998 to the Ministry of Information Industry (MII) in 2001 and finally to the Ministry of Culture (MoC) in 2002, indicating significant alterations in the policy goals being pursued. As of 2008, MoC is still the main regulator of Internet cafés. Its Regulation on the Administration of Business Sites of Internet Access Services, effective since November 15, 2002, remains the key ordinance regarding the Net bar business.

Why does China need to impose a regulatory regime, now that it already has a considerable set of general-purpose Internet regulations controlling everything from infrastructure and content to providers and users? This intriguing question was posed by legal researcher Murray (2003). The ineffectiveness of existing Internet laws and the lack of central coordination among enforcement mechanisms are two possible answers. Another is the logic of power maximization when there are few checks and balances against regulation. But these do not explain everything, especially why since 2002 there has been less effort to upgrade Net bar regulation at the national level even more.

That not much has changed since 2002 does not suggest that the situation is satisfactory. MoC's main undertaking has been the chain store model of Net bar management, which has so far failed to achieve its stated goals. An understanding of the regulatory updates requires going beyond the directives because regulations are not only developed and imposed

superstore in Beijing offered a range of services, from printing and photo-copying to scanning, catering to customers at different income levels, from a variety of backgrounds, and with different needs. Such arrangements have now almost entirely disappeared.

Most Net bar computers today are configured for entertainment. They are optimized for online gaming, chatting, and video watching, with the help of regularly updated hardware and software, from webcams and LCD displays to the latest programs. Because they do not have a CD-ROM, a USB harbor, or an external disc reader for fear of computer virus infection, they are unsuitable for international travelers, bloggers, or hackers. They are powerful in delivering games and full-length movies but crippled in fostering more creative user-driven content. The technology has spawned a new generation of users who visit Net bars to kill time, be amused, and play. Many of them stopped checking e-mail partly because they cannot store their messages on the computers and Web mail is slow, and partly because they already have SMS and can transfer files through QQ, the popular Chinese online chatting service provided by Tencent Ltd.

The technical upgrades have create a huge market, considering that China has at least 112,264 Net bars equipped with about 6.1 million computers that needed to be updated every couple of years (*Guangming Daily* 2006). This produces significant business opportunities because in order to attract customers in this competitive market, all Net bars have to use up-to-date software and regularly upgraded equipment.

The decisions for making upgrades, however, are also made for rather than by the Net bar operators. The size of the market and the heavily regulated nature of the industry mean that authorities and corporations both want a large piece of the pie. For example, Filter King (*Guolwang*), an Internet café content-filtering system, has been widely adopted because it is what the police require. Produced by Zetronic, a software company in Zhuhai, Filter King was among the first to be endorsed by the MPS at the national level. It soon became the most common system required by provincial and city police authorities. Between 2002 and 2005, it matured from Version 1.0 to Version 2.8 with increasing functions in monitoring, tracking, and filtering information, while the number of its Net bar subscriptions nationwide grew to more than 50,000.[12]

Filter King works with a central server located in a local police bureau, controlled and maintained by the local Internet police task force. At the user end, all computers in registered Net bars in the area have to install Filter King software and connect to the central server. Data exchange occurs between the server and individual computers to ensure surveillance

over all online communication. To ensure this data exchange, subscribing Net bars have to run the same version of Filter King as the one used by the local police. This means that every time the police upgrade their system, all connecting Net bars have to follow suit, a costly process of mandatory upgrading.

The MoC also attempted to create its own surveillance market, although with less success. Its main filter system, Clean Net Pioneer (*Jingwangxian-feng*), encountered more difficulty in diffusion and was relatively easy to bypass (Su 2005). Its installation fee is calculated on a per-computer basis, which is much more expensive than Filter King. Most Net bar operators were reluctant to install it because they believed it was buggy and incompatible with the existing system used by the police. Programs designed to disable Clean Net Pioneer can be found online for free download, which is unlikely to happen to systems like Filter King given the formidable power of the police. Since March 2005, MoC has promoted its "Sunny Plan (*yang-guang jihua*)" for the Net bar industry, which encompasses not just filtering technologies but everything from computer hardware to service provision to the improvement of the public image of Net bars. But the program was too ambitious and propagandist to produce real impact.

Local companies with government backgrounds can be another major factor. This is the case of Pubwin, the most widely used Net bar OS in the country, developed by Hintsoft (*Haoyi*), a software company founded in November 1998 under the auspices of the Shanghai Municipal Informatization Office.[13] After being deployed in Shanghai and nearby cities for a few years, the Pubwin system was upgraded to Version 4.0 and finally received endorsement from the MPS. In 2005, Hintsoft was further upgraded to Pubwin EP, designed for large-scale Net bars. By this point, it accounted for more than 50 percent of the national market share (*YeskyNet* 2005).

Important to note in these cases is the involvement of multinationals. Hintsoft received venture capital from the International Data Group (IDG) in July 2005. Corporate sponsors of MoC's Sunny Plan included global players such as Intel and Philips (*Blogchina* 2005). According to John Du, director of Intel China Research Center in Beijing, his company places particular emphasis on China's Internet cafés by helping them "do upgrades, monitor their PCs, and do maintenance," because they constitute a main part of "the next usage model" (Einhorn 2006). Since 2005, Intel has been a prominent player in China's cybercafé hardware market. Although regulation and state sponsorship still matter, there is relatively more of a market component, less dominance by the MoC (or even MPS), more

chances for local products to spread, and more involvement of trans-national players. In this area of operation, Net bars are recognized as an important and legitimate business rather than something problematic by nature that can survive only at the mercy of officials. But this is at the same time a highly manipulated market of entertainment machines, serving a small spectrum of the informational needs, narrowly defined for, rather than by, the information have-less.

Business Models: Old and New

The Internet café business started in the 1990s with a simple idea. For almost everyone then, computers and Internet access were expensive and required technical expertise. Therefore, café owners could make a profit by purchasing access bandwidth at the wholesale rate and selling it through retail to end users. There were investments on equipment and site renovation as well as operational costs for rent, labor, and maintenance. But this simple business model proved to be effective in yielding a decent profit, given the significant difference between wholesale and retail prices at a time when there was strong public curiosity in everything related to the Internet.

This original model had to respond to changes in policy, technology, and market dynamics, and in so doing, it became more complicated. At the turn of the century, with the emergence of mass-service Net bars, advertising in the form of posters or computer wallpapers became ubiquitous, promoting not only online games but also computer software and hardware. Stores previously selling only coffee started to offer a variety of drinks, cigarettes, and snacks ranging from instant noodles to tea-flavored eggs. The service expanded to include prepaid cards for long-distance phone calls, dial-up Internet access, and online gaming. The new poster ads and add-on retail business brought in extra revenue.

But more important, the modified model had much higher costs under the new regulatory system of licensing, taxation, and mandatory technology upgrades. Until the late 1990s, no license was required to open an Internet café. But to register a Net bar today requires at least four licenses: from the local bureau of cultural affairs, the public security bureau, the bureau of industry and commerce, and the telecom authority. Net bars are required to display all these licenses prominently, a discriminatory treatment seldom found in other IT-related businesses. The number of required approvals can run up to more than a dozen, for example, in Sichuan.[14] Some city authorities have even suspended cybercafé registration altogether. A black market for Net bar licenses thus came into being.

In Shanghai, for instance, licenses needed for one Net bar could be sold for 240,000 yuan ($29,000) in early 2004.[15]

Registration is only the beginning of the additional costs. Because Internet cafés are officially categorized as the entertainment trade (*yule hangye*) or special trade (*tezhong hangye*), it is subject to a heavy taxation of 20 to 40 percent of the profit.[16] This stands in stark contrast to other IT sectors that enjoy much lower or zero tax rate, not to mention government subsidies that Net bar owners cannot even dream of.

The upgrading of surveillance devices required by regulators is another expense. In 2002, a Pubwin system cost about 500 to 600 *yuan* (about $$61 to $73) to install and 100 to 200 yuan (about $12 to $24) for annual updating, which included all computers in a Net bar. Clean Net Pioneer has charged 45 yuan ($5.50) per terminal since 2003, which is expensive because the cost can run easily into thousands of yuan.

Moreover, harsh fines, suspension of business, and confiscation of machines need to be considered increasingly as a part of a Net bar operating budget. Through licensing, taxation, mandatory updates, and fines, the business operation of Net bars has become tied to the income of some local governments. This explains why local state authorities are active in clampdown, yet they do not want to eliminate the cybercafé business. These are predators positioned high up in the food chain in an odd ecology of revenue sharing. At the end of the day, it is in their interests to see growth in this working-class ICT. This symbiotic relationship—an imposed patron-client relationship—then forced cybercafés into a downward spiral, a pathetic lock-in that should be blamed for spawning black Net bars.

Meanwhile, the truly profound transformation took place. The original business model of the Internet café targeted high-end customers in major metropolitan areas. But now upper-class professionals in Beijing and Shanghai have Internet access at work or at home, and their informational and entertainment needs are taken care of by mass media and mainstream cultural institutions. Why would they want to visit cybercafés? It is only natural for Net bars to serve primarily the information have-less in the back alleys, at the city peripheries, and in small towns. In such small cities as Guangshui, Hubei Province, and Yima, Henan Province, cybercafés play a central role in Internet dissemination. (Guo 2004). They have also appeared in the countryside, where some cybercafés "charged as little as one yuan ($0.12) for several hours of use" (Harwit 2004).

The flight from the elite market has produced results. To save on rent, cybercafés in most downtown areas moved from prominent street-level stores to either above-street-level quarters or basements. New Net bars in

general avoid city centers. They popped up in suburbs and low-profile communities, including places like labor markets where high-mobility populations are concentrated. Some Net bars went underground, putting up signs of computer schools, or no sign at all, admitting known customers only.[17] Some others are set up in private households like the clay-cave homes of Yaodong in northwestern Shaanxi Province (Guo 2004). All of these are bottom-up business responses by have-less service providers to the decline of profitability under the pressure of state regulation and public scrutiny, drawing on local and regional network resources.

The materialization of the Net bar business model is a highly localized process contingent on local situations. While most Net bars followed an entertainment-oriented model, in Shenzhen, China's largest special economic zone (SEZ), there is more complexity and diversity in local business models owing to the combination of two factors. First, this is a city of young migrants, with workers from different backgrounds. Second, transborder activities, particularly with Hong Kong, account for a large part of the local economy. As a result, the local government has limited the scope of its regulation, which in effect has shielded local Net bars from the national pattern of homogenization.

WiseNews, the world's largest Chinese-language news search engine, is headquartered in Hong Kong, but most of its data processing employees work in Shenzhen. According to Ringo Lam, the CEO of WiseNews, one attraction of Shenzhen has to do with the cybercafés, because when there is a network failure or power outage at his Shenzhen facility, employees can still meet deadlines by using Net bars conveniently nearby.[18] Obviously, computers in these cybercafés are more than one-way entertainment machines. They are equipped with the necessary hardware and software to support transborder work activities, in this case, the preprocessing and processing of large quantities of news articles, including cleaning up the text, tagging, and working on the same database from multiple locations. It is not a coincidence that these Internet cafés exist in Shenzhen.

At the national level, a main issue of contention during recent years is the chain store model (Qiu and Zhou 2005). According to the MoC in April 2003, the goal is to upgrade Net bars into "large-scale chain-stores with themes and brands (guimohua, liansuohua, zhutihua, pinpaihua)." To achieve this goal, ten companies, mostly affiliates of MoC, were licensed to create national chain stores, and each province was allowed to set up three provincial chain stores. To force new Net bars to join chain stores, a national freeze on the licensing of individual cybercafés has been recommended since 2003. The chain store model was advocated as a panacea serving

everyone's interests because it could supposedly improve the public image of Net bars. It was expected to facilitate the implementation of café regulation by bringing individual shops under a standardized organizational structure. It might also help Net bars through collective purchase and maintenance at larger economies of scale, as advocated in MoC's Sunny Plan (Blogchina 2005).

The reality of the chain store model, however, is quite different given the reality of local urban politics. Most Net bar operators I interviewed saw this new business model as nothing but another attempt at exploitation. They have to pay a sizable fee for chain store membership, yet they seldom receive the promised services. The equipment and software sold by chain store operators to individual stores are often seen as shoddy and overpriced. A main "service" of the chain-store company was, in fact, to alert its members to incoming official inspections so that they could be prepared, an act countering the moralistic goal of regulation that justified the chain store model at the first place.[19]

A few years after MoC's advocacy, the chain store model still looked marginal in the national Net bar industry. As of 2006, only five of the ten national enfranchises had been set up, and chain stores accounted for only 5.7 percent of all cybercafés (D. Zhu 2006; Guangming Daily 2006). The failure is unsurprising because MoC picked its affiliates with no experience in Net bar operation, parachuting them into the industry, assuming they would be commercially viable because of this official blessing. In this process, they excluded existing chain stores like Feiyu in Beijing and the EastdayBar (Dongfangwangdian) in Shanghai, which were better positioned with much better brand recognition to develop coalitions nationwide than any of the ten handpicked licensees.

The failure of the national chain store model demonstrates the capacity of have-less ICT providers in resisting the logic of top-down upgrading. Although so far there have been few incidents of direct confrontation comparable to the Lishui Net bar strike, the rallying of small café operators has given rise to a series of online forums such as World Net Alliance (Tianxia wangmeng), by far the largest one, with more than 500,000 members by June 2007.[20] There are also smaller forums like www .netbarguide.com that function as platforms of information exchange as well as social support, through which individual Net bar providers, scattered as they are, come to recognize their shared issues and collective effort in resistance and empowerment.

A key model for the business operation of Net bars is based on China's burgeoning online gaming industry, whose total sales revenue reached

3.77 billion yuan ($460 million) in 2005, with an average annual growth rate of around 50 percent (IDG and WCGCP 2006). The leading online game company, Shanda, had approximately 600 million user accounts by the end of 2007,[21] and its CEO, Chen Tianqiao, was once China's richest man (H. Fan 2004). The tremendous growth of the gaming industry has been so impressive that it was regarded as a fresh business model for China's Internet industry in general, paralleling earlier models centered on online advertisement, e-commerce, and then SMS. Even the Chinese government has decided to foster the industry by investing $2 billion in online games (Taylor 2006). The main justifications include the country's aspiration for its own creative industry, the need for Chinese gamers to gain independence from Korean and Japanese games, and the centrality of online gaming in the life of Chinese youth.

Cybercafés are crucial for online gaming in three ways. First, they provide a major channel of service and content delivery, especially to the vast low-end market that could not have existed without the collective mode of Internet access. Second, Net bars collect fees from gamers by selling prepaid gaming cards produced and distributed by Shanda and other game companies. This is particularly important because most members of the information have-less do not have credit cards or even bank accounts. Third, because Net bars are the main place where have-less gamers gather, they also offer a venue for targeted advertising and promotion of new game products.

These games play an indispensable role for Net bars by attracting customers to the cafés, retaining them, and letting them consume all the products and services provided there. There is therefore a tight symbiosis between Internet cafés and online gaming because neither could have reached the current scale without the other. In this sense, one may regard gaming as the most strategic industry partner of Net bars. One may even expect the more favorable official policy toward gaming to spill over to cybercafés and legitimatize them, or at least mitigate the systematic discrimination against them.

But is this true? A closer examination reveals a surprisingly high degree of tension between Net bar operators and the gaming industry. In the Second Internet and Entertainment Content Expo of China at the end of October 2004, Net bar owners challenged and embarrassed Chen Tianqiao, Shanda's CEO, by accusing his company of doing nothing for cybercafés. In response, Shanda launched its Winter Sysop Care Program (*Dongji wangguan guanhuai jihua*) within a month and claimed it to be "the first-ever service program for Net bar system operators provided by the [gaming] industry" (W. Lu 2004).

A few opinion leaders in the online forums of cybercafé operators, however, showed no sign of compromise. Three days after Shanda launched its Winter Program on November 28, the Manifesto on Boycotting Shanda Games appeared online. It soon spurred a deluge of accusation among Net bar operators against Shanda and the entire online gaming industry. One widely circulated poem at the time ended with this call for action.[22]

Arise, Net bar, challenge the hegemony of the gaming industry over the right to profit!

Arise, Net bar, break the monopoly of the gaming industry over huge wealth.

Arise, Net bar, undermine the means by which the gaming industry controls gamers!

Arise, Net bar, breach the battlefront of the gaming industry built on content.

Arise, Net bar, we constitute an immense sales platform.

Arise, Net bar, we have the terminals to be consolidated.

Arise, Net bar, together let's say NO at the top of our voice to the gaming industry!

Arise, Net bar, let's overthrow the unreasonable profit structure from tip to toe!

Ah, Net bar,

Sound your bugle call for battle!

Winter has arrived. Can spring be far behind?

The author of this poem, using the name Li Hongli, is undoubtedly among China's more literary Net bar operators. Drawing from the PRC national anthem and Shelley's "Ode to the West Wind," the lines mix militant language, typical in the Maoist age, with the terminology of the New Economy. Strong emotions are cast against the gaming industry, whose actual "hegemony" is far from comparable to other monopolies like MoC, MPS, MII, the national chain stores, predatory local state agencies, or even the mass media.

Such a burst of anger might have resulted from Chen Tianqiao's rise to China's richest man a few months earlier in 2004. It was also based on the emergent Net bar forums and online social networks of Net bar operators throughout the country. The gaming industry was singled out because it was a soft target that could not retaliate like the authorities. Unlike the official and quasi-official stakeholders, gaming companies, including Shanda, face intensive domestic and international market competition. It was within such market structures that the call to boycott could make sense. Another reason is that polemics against online games may spread more widely and stay online longer compared to discursive challenges to the authorities and their commercial affiliates, which probably would be censored in the first place or erased soon.

The dispute with the online gaming industry nonetheless demonstrates the political awareness of working-class providers, which has increased over the years, as shown by the expansion of their online forums and networks and critical incidents like the Lishui Net bar strike. However, collective actions remain rare. When they do happen, online or offline, their scope of influence tends to be so limited that it is still too early for them to challenge and alter elite domination at the structural level. Also important is to note that with such limited collective actions, we hear mostly about Net bar owners and operators, but rarely from their employees, who are mostly less educated migrant workers and laid-off workers, especially female labor, and ordinary café users, mostly youth.

The Commons of the Have-Less

Cybercafés offer a collective mode of access. They provide working-class connectivity that is inexpensive and shared to members of the information have-less. In so doing, they constitute an informational commons at the local level, generating hope and aspiration, conflict and despair, through the experiences of grassroots entrepreneurialism and everyday urban politics.

But is "commons" a misnomer, given the nearly universal drift toward privatization and commercialization? In contemporary China, with the decline of Maoist socialism, shared collective spaces of all kinds are being eroded, if not eradicated, in most social, economic, political, and cultural domains. Why, then, should collectivity matter at all? Why is it important, especially to the formation of network labor?

This is where the previous analysis can inform us. First, there were in fact multiple alternatives for Internet cafés to evolve, including but not limited to promotional cafés, Feiyu's free morning hours and training sessions for seniors and laid-off workers, and Net bars supporting hackers during the "patriotic cyberwars," although most of these have evaporated with the crackdowns and relentless upgrading. Second, in the absence of public sponsorship, spaces of the commons have little choice other than relying on private ownership and commercial deployment. This is particularly true when it comes to a fast-changing ICT business trying to survive in the context of contemporary urban China. However, just as privately owned bars served a public function for the emerging bourgeois of nineteenth-century Europe, so can privately operated Net bars sustain a space of shared experience for the new working class of the twenty-first century.

An important trend in recent years has been the growth of cybercafé-based virtual guilds (*gonghui*). Some of these guilds consist of gamers spontaneously organized on the basis of horizontal grassroots friendship networks, for example, among classmates and coworkers. Others include more vertically organized commercial units of the so-called Chinese gold farmers: those who collect "in-game currency in Massively Multiplayer Online Role-Playing Games (MMORPG) for the purpose of selling it to other players for real world currency."[23] These guilds represent a more flexible and yet networked mode of labor organization, an emerging form of network labor based on user-generated content, which would be hard to imagine without the widespread of Net bars (H. He 2005, Chew and Fung 2007).

Besides collective gaming (and collective work in the case of the gold farmers), a more traditional way of labor reorganization proceeds among the average staff members of Internet café below the level of Net bar owners. These are the people who sweep the floor and work at the counter. These are migrant workers from the countryside, who account for the bulk of the workforce for Net bars in the more developed regions of coastal China, as well as unemployed or underemployed youth, who fill in the lowest strata of jobs in the cybercafé business, especially in the inland provinces.

Chen is a young attendant in the remote city of Xichang in West China. At age twenty-two, he was already a laid-off worker from a bankrupt iron and steel factory, where he had worked for three years. In 2002, when I interviewed him, he was one of the two attendants at a small Net bar. Working a twelve-hour shift, seven days a week, Chen did not have health insurance or legal labor contract. With food and housing provided by the owner (a local China Telecom employee), his monthly salary was 300 yuan ($37). Yet he was happy because he could surf the Internet for free.

A similar position in the cybercafé market may provide a shared basis of class formation among these low-end have-less service providers. But it is important to note that economic domination also leads to discursive and political disempowerment. Ji is another attendant at a large-scale chain store, who migrated with his family from northeast China to Guangzhou in the South. At one of the most revealing moments, Ji confessed: "Now, even my folks feel it's sort of a shame for me to work at a Net bar. You know, talking about Net bar today is like talking about nightclubs in the 80s."[24]

There was a lot of truth in this revelation, considering especially that the interview was done in the wake of the Beijing café fire in summer 2002.

operators have to learn to manage their business in a suppressive policy environment. They have to find out how to survive while being forced to take a leap in the dark. They have to deal with commercial competition and public stigmatization at the same time. It is this experience of struggle and a collective will to survive that provide the cornerstone of the new class dynamics. This trend is evidenced by emerging networks of café operators that were behind their online forums and the Lishui Net bar strike.

But coalition building remains a weak link, and the tragedy of the commons still hounds the cybercafé business. Market competition leads to a serious lack of mutual trust. Net bar operators are divided along myriad lines of demarcation with regard to their relationships with the regulators, chain stores, online gaming companies, equipment providers, telecom operators, and so on, many of them characterized by vertical patron-client ties. There has also been increasing confrontation, including violent incidents, between have-less users and have-less providers in recent years. Consequently, it is extremely rare to find the organizational solidarity to sustain something like the Lishui strike. Although collective identification among Net bar operators is advancing, they seldom seek to expand their horizontal networks to include other players or even the cybercafé workers they hire.

3 Going Wireless

Working-class ICTs not only take the wired form of Internet café but also a number of wireless modes, each having its own process of emergence, transformation, and, in certain cases, decline. Some of them, like SMS and prepaid services, have been emerging worldwide in industrialized nations as well as the global South (Castells et al. 2006). Others are more specifically Chinese, such as the country's domestic handset manufacturing industry and the Little Smart wireless system. Together they offer new modes of working-class connectivity to China's urban underclass, most of whom never owned telephones previously. To these have-less people, a mobile handset, or *shouji*, is often their first phone. In many cases, it is also their first personal ICT device of any kind.

How has the mobile phone become a working-class ICT? What wireless services are offered to China's information have-less? How and why do these working-class wireless technologies materialize, through what institutional processes, on the basis of what grassroots networks? What are the associated challenges, latent or manifest, and the general lessons to be drawn?

This chapter first examines the reform context of China's telecommunications sector, which sets the stage for the emergence of *shouji*. A central part of this process is the rise of a domestic handset manufacturing industry. We then look at a few specific parts of the burgeoning wireless market: the Little Smart, SMS, and prepaid mobile services. These services have helped wireless technology reach large numbers of have-less users while creating significant job opportunities for the urban underclass. These services do face commercial competition and persisting government control in selected social domains, which shapes the mode of use, technology design, and patterns of service and content provision. Finally, we consider the waxing and waning of pager service and its implications for working-class ICTs in general.

Telephone entered China in the late nineteenth century through European settlements along the coast, especially Hong Kong and Shanghai. A national telephone system was established by the end of the Qing dynasty (Baark 1997), which was expanded during the Republican era until the 1949 Communist takeover (He 1997). By then, penetration was 0.5 phones per 1,000 people, and nearly 30 percent of the lines were in Shanghai (Harwit 2004). As at the beginning years of the Internet, the telephone was mostly a technology for foreigners and a tiny fraction of the urban elite.

From the 1950s to 1970s, the gap in telephone access significantly narrowed between rural and urban areas as a result of Maoist policies that prioritized development in the countryside (Harwit 2004). But with market reform under Deng Xiaoping, the pendulum swung back to the cities, and urbanites again enjoyed faster telephone growth than rural residents (He 1997). At the end of the 1980s, the telephone remained a luxury and a symbol of power. It was usually an exclusive means of communication paid for by the government, installed only in important public offices and the residences of high-rank cadres.

By this time, the slow growth of fixed-line telephony had been widely regarded as a major bottleneck for the expansion of the Chinese economy. This was reflected in the country's Eighth Five-Year Plan (1991–1995), which attached special importance to telecommunications, along with energy and transportation. Major reform of the telecom sector was proposed and implemented to foster a more competitive market, serving not only the authorities but also others who could afford telephones (Mueller and Tan 1997).

The first analog mobile phone service appeared in China in 1987, when the old telephone system was under serious stress. National teledensity was 0.75 phones per 100 people. There was a huge untapped market, and Beijing was trying to boost telecom growth. However, mobile communication did not take off until the mid-1990s (figure 3.1). Several factors thwarted faster diffusion in these years: not only price and service quality but also the economic and political unrest of the late 1980s, culminating in Tiananmen, and the subsequent unpredictability of the early 1990s. Investment priority within the industry was given to landlines, microwave service, and the emerging ICT of the time, the pager.

After China entered a new phase of "neoliberalism with Chinese characteristics" in 1992 (Harvey, 2005), investment, especially foreign direct investment (FDI), significantly increased. China Unicom was established in 1994, breaking China Telecom's monopoly (Mueller and Tan 1997). That year also marked three other milestones in the wireless market: total
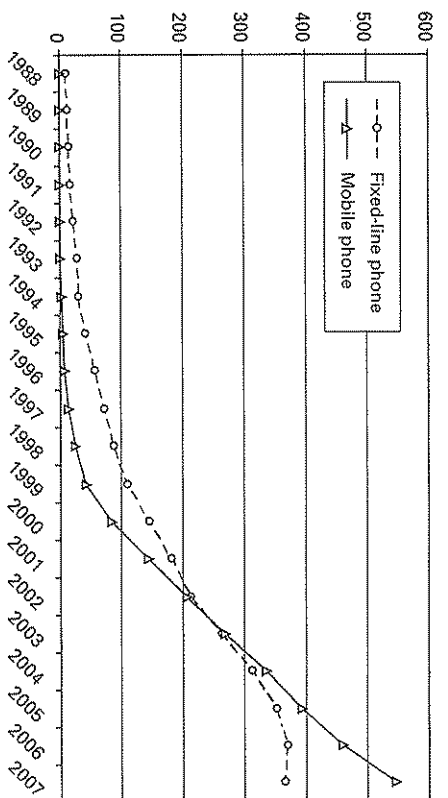
Figure 3.1
Year-end total subscriber population: fixed-line and mobile phones, 1988–2007 (millions). *Source:* MII (1998–2007).

mobile subscription reached 1 million; the Mobile Communication Division (MCD) was set up inside China Telecom; and the country's first digital service, using GSM, was launched by Unicom (Harwit 1998; Le, Qiao, and Sun 2006). Throughout the 1990s, the mobile market maintained an average annual growth rate of 141.8 percent. The diffusion curve tipped in 1998–1999, when MCD was separated from China Telecom and became China Mobile, the biggest player in the mobile market.

At the turn of the century, wireless communication finally began to spread to the lower social strata, a development that brought a sea change to the entire mobile phone industry. By October 2003, the number of mobile subscribers surpassed that of landline. By the end of 2007, China had the world's largest national mobile subscriber population: 547.3 million plus 84.5 million low-end Little Smart subscriptions. In comparison, the United States had 241.8 million mobile phone subscriptions in 2006 (FCC 2008). The much larger Chinese market would be difficult to imagine without the information have-less, who provide not only a crucial consumer basis but also the essential labor for this new and extraordinary mobile phone industry.

The Fateful *Shouji*

The term *shouji* was popularized by a blockbuster movie a few years ago about how the mobile phone influences upper-class Chinese families,

especially in extramarital affairs (Y. Zhao 2004; Castells et al. 2005). Commercial discourse in urban China continues to associate mobile communication devices almost exclusively with the urban elite. Departing from this conventional perspective, we ask, What is the trajectory for the mobile phone to spread to the lower strata of China's urban society? How did the device change from a gadget for the elite to a working-class ICT?

In 1996, the year I received my first e-mail at the Beijing Internet café, my friend Kent came to my dormitory with something extraordinary: a black Motorola 3200, the exemplary mobile phone of the 1990s. This was the world's first digital handset. Although I had never before seen a mobile phone up close nor had my dormmates, we had all heard about it and seen it in movies.

Gangster movies from Hong Kong played a major role in popularizing the device as *dageda*, meaning literally "Big-Brother-Big," which was the default nickname for a mobile phone in the 1990s. Socially, *dageda* was very different from *shouji*, although the underlying technology was roughly the same. One has to be a Big Brother (*dàge*, i.e., a powerful man) to enjoy *dageda* connectivity. The assumption is gendered, excluding gang outsiders, and very much about power hierarchy. In the movies, *dageda* is usually used by the Big Brother of some group to negotiate drug deals or send out fateful commands such as assassination orders or the release of a hostage. Sometimes it is also an assault weapon because it is thick and heavy.

So Kent had his *dageda*, and everyone, including people across the corridor, took turns touching and admiring the device. We felt lucky to be able to see this phone up close, and indeed we were, because this was not an ordinary dorm but one in a privileged university, and my friend Kent worked for a resourceful government office. Like most other mobile users at the time, Kent did not need to pay anything out of his pocket for the phone. His *danwei*, or work unit, paid for everything: the phone, the accessories, the monthly bill (at least 10,000 yuan or about $1,208), and another several thousand yuan for activating the phone number. Although the Motorola 3200 was an import and we called it by a Hong Kong nickname, the social structure underneath it was a continuation from the tradition of Maoist socialism, when telecom was less a business than a public service "serving the people"—specifically, the people in key work units, the elite.

Were it forty or just ten years earlier, the underlying organizational structure built on high fees, official use, and market monopoly would have remained intact longer. After all, why would stakeholders choose to abandon their privileges, especially the more imposing ones, like the

dageda and the prestige it carried? But this was a different time, and the pace of change had to be considerably faster because China's telecom industry had begun to reform.

The establishment of China Unicom in 1994 as the second national telco dealt the first blow to China Telecom, the traditional monopoly. Unicom's first major move was about the mobile phone. In 1995, one year after its funding, Unicom started to provide GSM (global systems for mobile communications) digital service. In a little more than three years, its GSM subscription reached 1 million. In contrast, although China Telecom had a lot more resources, it was hesitant about building its digital mobile networks (Le, Qiao, and Sun 2006).

Unicom had the latecomer's advantage. It did not have much in the way of a landline or analog mobile system, so it could concentrate on everything digital. In 2002, Unicom launched China's first CDMA service (CDMA stands for code division multiple access, an advanced digital mobile communication standard at the time), putting additional pressure on the incumbent. Although Unicom has gradually lost its strategic position as a formidable market contender, it did play a historic role in pushing up competition and driving down prices in the market. Even today, Unicom usually offers less expensive services and is particularly active in small towns and working-class neighborhoods as compared to China Mobile.[1]

The biggest challenge to China Telecom, however, came from within. The MCD was set up within China Telecom in 1994, and by 1999 it had grown into an independent corporation, China Mobile. As the divorce concluded in 2000, China Telecom was relieved of its mobile telephony license, and China Mobile became the leading company in the wireless market. The most critical change brought by China Mobile is arguably in the investment structure of the industry.

Since the funding of the PRC, insufficient state investment had been a key obstacle to the growth of telephone in China (He 1997). To solve this problem, China Mobile was set up as an experiment to connect the national telephone sector with the global flows of capital, thus introducing the logic of the stock market. In 1997, China Mobile became the first Chinese telco ever listed on the New York Stock Exchange and the Stock Exchange of Hong Kong.[2] One by one, the three other national telecom operators followed suit: China Telecom and China Unicom in 2002 and China Netcom, which received half of China Telecom's assets, in 2004.

For the information have-less, this entry into the global capital market was both a blessing and a curse. It had the positive effects of diluting and bringing down the old elitist model of operation centered on the top levels

of China's urban society. In order to be listed on the stock exchanges, even before the initial public offering (IPO), companies needed to show that they were running a business with not only high profitability but also growth points (*zengzhangdian*): new areas for capital accumulation. In China, the mobile market has been a prominent growth point since the late 1990s.

The extraordinary commercial expansion of the mobile market was due only in a small part to official mobile subscription as in the case of Kent's *dageda*. The decisive factor was that the mobile phone can now be adopted by a large number of ordinary people, especially members of the have-less. To this end, telecom companies had to offer less expensive handsets while providing better services to attract and retain customers. Market competition in this way destabilized the traditional elite model and made the technology more affordable and accessible. Hence, it was after the initiation of such a market-oriented process that we had the term *shouji*, meaning literally "handset" or "handphone," which indicates a technosocial relationship much more inclusive than *dageda*. Finally, wireless service is not just for the Big Brother; it is for everyone.

In 2008, one can buy a used domestic-brand *shouji* for as little as $1 in Shenzhen. Yet is *shouji* a real equalizer or source of empowerment for the have-less? The answer is complicated. Access to mobile phones, although beyond the traditional boundaries of elite-based landline systems, is still limited to those who can pay. Money takes the centrality previously attached to political power. The commercial model propels technology diffusion into the lower social strata but will not by itself lead to universal, quality service for have-less users. Nor will it automatically create a social structure that is fundamentally different and conducive to working-class formation.

Exclusion is obvious in the operation of the capital market at the macro-levels. Because all four of China's national telcos are now listed on stock markets, the notion of average revenue per user (ARPU), the key indicator for profitability, has thoroughly penetrated this industry. It is this corporate obsession with higher ARPU, rather than bottom-up consumer demands, that has led to the aggressive promotion of value-added services in recent years such as ring tone downloads, games, and the provision of a variety of content, such as news, jokes, greetings, and sex-related topics. The hard sale is sometimes imposed by mandatory upgrades of service packages and sometimes through SMS spam from the telcos and their partners. They also appear in advertisements, online, on billboards, in newspapers and magazines, in public transportation—indeed, throughout the landscape of the Chinese informational city.

In this process, have-less subscribers seldom have control other than bearing the annoying bombardments and, from time to time, paying a fee knowingly or unknowingly for services they may not need. They had little choice in the duopoly structure of the mobile phone market, with China Mobile being the dominant provider. As a female migrant in Guangzhou told me, she once tried to sign off mobile phone content service she had never requested, but her service provider did not allow her to do so. She was very upset to find out that her only solution was to shift to a new phone number to avoid the unreasonable fee, which means she lost contact with some of her friends.[3] In other cases, the *jiqunwang* (concentrated collective network) system has been implemented to use mobile phones to enforce social control, for example, in the development toward the "wireless leash." (Qiu 2007b) among factories in south China, as will be discussed in detail in chapter 6.

It is premature to take market expansion as equivalent to sociopolitical empowerment. Under the traditional structure of telecom provision, members of the have-less may still be subject to abuse and discriminatory treatment even after their absorption into the marketplace as consumers.

Besides reform in telecom service provision, an equally important change took place in the electronics manufacturing sector: the emergence of China's domestic mobile handset industry. This new industry, almost nonexistent in the 1990s, has made startling progress on a massive scale. In 2005, China produced 303.67 million mobile phones, or 40 percent of the world's total output. Of this number, 228 million were sold overseas, creating a total export value of $20.6 billion (Xie 2006). In 2006, the total output increased by 58.2 percent to 480.14 million sets, resulting in an export revenue of $31.2 billion (Ministry of Information Industry 2007).

Although we do not have specific labor statistics, a huge number of working-class jobs have been generated to support this rapidly expanding industry. Through these jobs in the manufacturing, transportation, whole-sale, retail, services, and used phone markets, some of the sales revenue has trickled down to blue-collar workers, working families, and, through their grassroots networks, other have-less populations.

Particularly crucial to the market of low-end mobile handsets is the rise of China's domestic brands, which played an instrumental role in lowering handset price and spreading the technology to smaller cities and towns. By 1999, the handset market was dominated by foreign brands such as Motorola, Nokia, and Eriksson, the three of which took up fully 95 percent of total sales (J. Zhang 2004). However, with policy support from the State Council and MII,[4] domestic manufacturers began to produce their own

models by late 1990s, and their market share surged to reach the record of 55.8 percent in 2003 (*People's Telecommunications Daily* 2003). Beginning in 2004, foreign brands fought back. As a result, the total share for domestic brands declined to 40.6 percent by the end of 2005, which was nevertheless still impressive considering the monopoly of foreign brands in the 1990s (Lin 2006).

China's leading brands—Bird, TCL, and Xiaxin—are known as the "Three Musketeers" (J. Wang 2005a). The most exemplary among them is Bird (*bodao*), located in Ningbo, south of Shanghai. Founded in 1992, Bird was initially a township enterprise making pagers and was later incorporated to produce mobile phones in 1999. It has since become the most famous domestic producer, selling more handsets than any other domestic brand for five consecutive years (H. Zhao 2006).

Bird exemplifies domestic firms in that its products cost only a fraction of the price of foreign-brand phones. In its take-off period from 1999 to 2003, the company bypassed the major metropolitan centers and went directly to small cities and towns using the sales expertise that it had accumulated while selling pagers. In so doing, it not only avoided clashing with foreign brands at their strongholds of Beijing, Shanghai, and Guangzhou but also developed a strategic network of sales, marketing, and postsales services throughout the country, beyond the scope of influence of the multinationals (J. Wang 2005a). As of 2006, Bird's nationwide network included thirty-six customer service centers at the provincial level, close to four hundred at the city and prefecture levels, and more than two thousand at the county and township levels.[5]

By pushing the frontier of competition into the low-end market, domestic handset makers like Bird forced foreign brands to respond in ways that are favorable to the information have-less. Hence, the Motorola C117 phone in 2005 cost merely 399 yuan ($48), making the handset more affordable (IT168.com 2005). Nokia spread its sales and service centers to more than three hundred cities nationwide, making itself more accessible to have-less customers (J. Zhong 2004). All these were efforts to reclaim lost market shares by better serving the have-less.

Accompanying the competition between domestic and foreign brands were three unanticipated developments. First, the industrial formation far outpaced market expansion, resulting in a serious surplus production capacity. By the end of 2004, domestic manufacturers had accumulated a stock of about 40 million handsets (*YeskyNet* 2004). The total number of licensed mobile phone producers also rose to more than sixty in 2005 (Lin 2005).

Surplus production capacity soon led to the second development: huge exports from China—on the scale of 228 million handsets in 2005 (Xie 2006). In 2006, the total export revenue of mobile phones was $31.2 billion, with a 51 percent increase from 2005 (Ministry of Information Industry 2006). Most of these exports bear foreign brands like Nokia and Motorola, although domestic brands like Bird have also made some inroads in fast-growing international markets such as India and Vietnam (Pday Research 2006).

Meanwhile, a series of Chinese companies emerged specializing in the manufacture and export of handset parts and accessories. BYD in Shenzhen, for example, once produced about half the world's wireless phone batteries (Fishman 2005). Its key to success is to subject migrant labor and key equipment to a novel management system of process flexibility, which essentially uses constantly retrained workers to "deliver a high variety [of batteries] at low cost" and, in so doing, outcompete expensive manufacturing in other countries, particularly Japan (Zeng and Williamson 2007). This is an exemplary model for programmable labor and network labor underlying Chinese informationalism, which is discussed in detail in chapter 6.

The third unexpected development is the surfacing of "black," or illegal, *shouji*, which is starting to display characteristics of the black Net bar. Black *shouji* are handsets coming from illegal channels: smuggling, unlicensed manufacturers, and the underground recycling of used (and sometimes stolen) phones. They have emerged because China's first-generation mobile users in the big cities are updating their handsets while market demand for inexpensive phones remains strong. Moreover, there is an army of have-less workers, many of whom are underemployed, who can provide the cheap labor for refurbishing and trading these illegal handsets, as in other parts of the world (Mooallen 2008). The result was, not surprisingly, a rectification campaign launched by MII, MPS, and five other ministries between November 2005 and March 2006 to clean up the market of second-hand mobile phones, confiscate black *shouji*, and round up illegal handsets dealers (*China Electronics Daily* 2005; China News Agency 2006).

The spread of *shouji* undermines the traditional monopoly in service provision and equipment production while giving rise to a new industry more responsive to market needs. It contributes to the laying off of employees of the traditional public phone system, from male line erectors to female operators, in the name of technology upgrading, competition, and the logic of the stock market. But it also creates a large number of working-class job opportunities for those involved in manufacturing handsets as well as in sales, services, and second-hand markets. The results of both
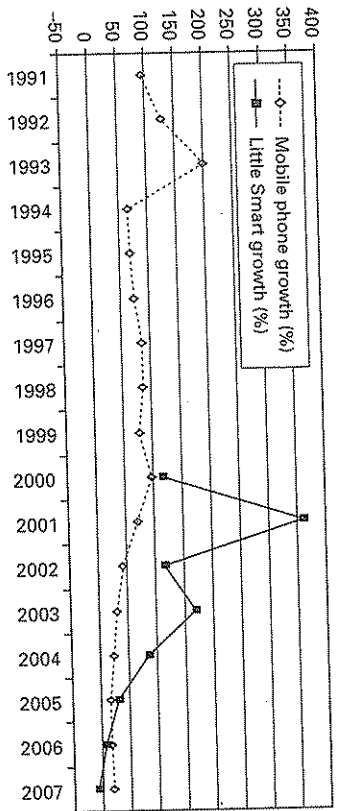
```
400
350    ---◇--- Mobile phone growth (%)
300    ---■--- Little Smart growth (%)
250
200
150
100
 50
  0
-50
      1991
      1992
      1993
      1994
      1995
      1996
      1997
      1998
      1999
      2000
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      2004
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      2006
      2007
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Figure 3.3
Annual growth of regular mobile phone and Little Smart subscriptions, 1991–2007.
Source: MII (1991–2007).

to four months to set up Little Smart services in a large city of 10 to 12 million potential users (Frost and Sullivan 2003). For subscribers, the price of a Little Smart handset usually ranges from less than $30 to $100, while a mobile phone often costs between $100 and $850. The monthly bill is also about one-third to one-half the amount for regular mobile service because of Little Smart's one-way charging scheme and its incapacity to roam. These, however, correspond to the expectations of have-less users because they do not want to pay for airtime while receiving calls (as is the case for regular mobile service), and many of them do not need roaming at all.[6]

Why didn't Little Smart, or WLL technology in general, materialize elsewhere on similar scale, not even in India?[7] A careful examination of archives and my interviews reveals several other facilitating factors in the processes that were coincidentally overlapping with each other at the moment of its emergence. Without any of these factors, the spread of Little Smart would have been much slower and the service might well have evolved into something much less appealing to the information have-less. Therefore, this is an "accidental accomplishment" of a working-class ICT (Qiu 2007a), which also explains the rapid slowdown of Little Smart diffusion since 2005 because the conducive conditions have largely disappeared.

The first of the accidental factors was the political legacy of China Telecom as the only telephone provider in the country until 1994. As indicated by the Eighth Five-Year Plan, the government at the time had an urgent need to increase teledensity in order to break the bottleneck

imposed by the underdevelopment of telecom on economic growth and reach universal service, a goal that Beijing had been trying to attain since the Maoist age (Harwit 2004). It was under such circumstances that China Telecom decided in the mid-1990s to experiment with the hybrid solution of WLL, using limited mobility technology built on fixed-line networks (Y. Lin 2005).

At this time, the initial justification was that this could be an economical way to increase teledensity in China's mountainous regions. Thus, when the first Little Smart trial site opened in Yuhang of East China in 1997 and when the first commercial launch started in Zhaoqing of South China in 1998, no one paid much attention. No one anticipated the service to become such a major success on a national scale because Little Smart was perceived as a supplement to the landline system, an "enhanced cordless phone" that would be deployed only in small towns in the mountainous areas (Y. Lin 2005).

Right after the Little Smart experiment in Yuhang and Zhaoqing began, large-scale change began to occur in the telecom sector, starting with the listing of China Mobile on the stock market in 1998 and its ultimate separation from China Telecom in 2000. Old phone business went through a quick—and, for China Telecom, painful—process of transformation from an integral part of the public sector to a new domain of competition and accumulation. The logic of ARPU weighed in, while China Telecom, now left with just its landlines, was going through its struggle of reform and restrategizing before the initial public offering with the help of Chinese authorities.[8] In this context, prioritizing Little Smart as a main growth point of China Telecom was unsurprising given the remarkable performance of the wireless market at that time.

From a larger historical perspective, it was coincidental that China's telecom industry was going through these structural changes right after the adoption of Little Smart. Had these changes taken place earlier or later, the story of Little Smart would have been less astounding.

China Telecom should have stayed away from the wireless sector after being stripped of its mobile operation license and its MCD. But it nonetheless invested heavily in Little Smart to tap the low-end wireless market. The mobile license holders, China Mobile and China Unicom, cried foul. As a result, between 1999 and 2002, MII issued a series of commands against expanding Little Smart, ordering, for instance, the canceling of all new Little Smart projects in October 1999, the suspension of all Little Smart operations in May 2000, and the exclusion of Little Smart from big cities in February 2001 (Qiu 2007a).

of Little Smart being quite uneven at the local level.[10] This again has to do with the localized nature of the diffusion process, in which local agencies decide largely independently how the service is to be set up. In places where the incentives are strong, Little Smart can reach the same level of service quality as regular mobile systems. For example, in Zhoushan, Zhejiang Province, local landline operators gave users sizable rewards (about 1,000 yuan or $120) for identifying blind spots where the Little Smart signal was inadequate. Using such mechanisms, signal quality can be improved quickly, leading to stronger customer satisfaction. One retiree whom I interviewed in Ningbo, Zhejiang Province, chose to use Little Smart as his only phone line, his "lifeline," indicating the reliability of the service in this medium-sized city.[11]

Little Smart does not have to offer low-quality service as long as the local telcos are committed to improving it. Telcos in Shanghai have much less incentive because the city adopted Little Smart rather late in the process, when its affluent residents already had regular mobile phones. For these companies, meeting the informational needs of the have-less, who are more sensitive to price, is but one of its many goals. In contrast, price sensitivity is much higher in the mainstream market of smaller cities like Ningbo, Zhoushan, and Xi'an, where Little Smart systems also happened to be deployed several years earlier than in the key metropolis. Small-town telcos therefore are more likely to capitalize on this working-class ICT.

But commercial incentives often exist only in the short run. Given the vicissitudes of market dynamics involving such fast-changing factors as technology and capital flows, there is no guarantee that the incentives will last. They may also become detrimental to the spread of low-end ICTs. After all, despite the size of the market, Little Smart's ARPU is low because subscribers choose the service precisely to lower their phone bill. With this realization in mind, it is odd to try to increase user expenses for Little Smart because to do so would drive away working-class consumers. Yet the logic of ARPU is dominant, and it meshes with the discourse of technology upgrading, as in the case of Internet café.

Consequently we see a number of efforts to make more expensive Little Smart handsets—some with color display, some with a dual-mode switching function between PAS and GSM, and some costing about 3,000 yuan, or $360 (China Telecom World 2004). Since 2003, SMS and VoIP (voice over Internet protocol) services have been added to Little Smart systems, which have been well received, as well as Internet access functions (such as general packet radio service or GPRS) and ring-tone downloading; neither,

however, took off. A controversial proposal appeared in 2004 when some China Telecom and China Netcom employees proposed to add roaming capacity by a mandatory upgrading of all Little Smart systems, including handsets, on May 17, 2005, World Telecom Day. This proposal triggered immediate opposition among telecom analysts and has been indefinitely postponed (Shen 2005).

These upgrading efforts have intensified since 2005, but they do not lead to the continued prosperity of this working-class ICT. On the contrary, Little Smart entered a period of deceleration and market contraction, evidenced in the subscription figures of 2006 and 2007. UTStarcom's financial performance is another telling indicator. In 2003, the company had total sales revenues of $1.97 billion and a net profit of $216 million, mostly from Little Smart. In 2005, its revenue was $2.87 billion, but with a net loss of $533 million. In 2006, revenue declined to $2.46 billion, and it still lost $117 million.

As of 2008, Little Smart remains a prominent Chinese wireless working-class ICT despite unfavorable arguments from mobile operators and the self-destructive tendencies within the industry itself. Its value should be recognized not only for low-end consumers but at the level of China's entire wireless communication market. Little Smart has challenged mobile operators to lower prices by launching, for example, a variety of package (taocan) services that are getting increasingly close to the cost level of Little Smart. In May 2006, China Mobile Beijing also began to experiment with one-way charging packages, an obvious response to competition from Little Smart (Mao 2006).

Little Smart is a typical wireless working-class ICT that is being shaped under the conditions of Chinese informationalism. It is probably the most successful wireless development in the first five years of the twenty-first century, provided by fixed-line operators under the pressure of the stock market. The socialist legacy, the decentralized, local-state-centered policy implementation structure, and the presence of a Chinese American company with strong Japanese ties were all indispensable to the success of Little Smart, which is, in this sense, a product of a historical moment, not of a social structure with long-term stability.

Short Message Service (SMS)

China has more mobile subscribers than any other country and the world's largest national SMS (short message service) market. Sending one SMS usually costs 0.1 yuan, or a little more than one U.S. cent. As figure 3.4
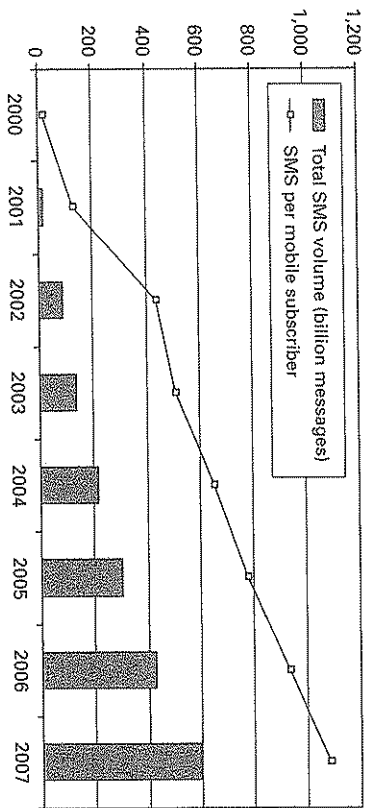
Figure 3.4
Growth of SMS traffic volume in China, 2000–2007. *Source:* MII (2000–2007).

shows, since China Mobile launched SMS in May 2000, the annual traffic volume has shot up from 1.4 billion in 2000 to 592.1 billion in 2007.

This is a remarkable expansion even considering the sheer size of the Chinese market. The growth of SMS significantly outpaces that of mobile phone subscribers. On average, a Chinese mobile subscriber sent 131 messages in 2001 and 1,082 messages in 2007. The more than eightfold increase in per capita volume indicates that there is something more profound than the diffusion of yet another ICT service. Behind the phenomenal growth of SMS is a real change in user behavior, the industrial structure of the telecom sector, and the concept of the telephone itself. Going wireless is not just about removing wires; it is also about adding computer-like capacities to the phone: the entry, storage, and retrieval of data; the receiving, sorting, sending, and forwarding of information; and, most crucial, the creation of meaning and the expansion of grassroots networks through *shouji*.

On the level of user behavior, SMS serves the functions of e-mail (asynchronous communication) since, in China, Internet use still lags far behind mobile use in terms of user population (figure 1.2). Voice call via mobile phone is often perceived as overpriced, especially among the information have-less, because it usually costs around 0.5 to 0.7 yuan per minute for both the sender and the receiver of a phone call. SMS, costing 0.1 yuan per message for the sender only, therefore provides an inexpensive alternative for working-class networking.

As in other countries, the appeal of SMS is most prominent among young users, given the challenge of entering and retrieving information on a

small interface. An English SMS is often limited to seventy letters. Alternatively, it may consist of seventy Chinese characters, which can contain more information than an English message of the same length due to the two-dimensionality of the Chinese ideographic characters, now usually entered through phonetic pinyin input and the word association function.[12]

For less wealthy groups, especially youth, there is another explanation for heavy SMS use. Many of them buy relatively expensive mobile phones as a status symbol.[13] They use their savings to purchase trendy handsets but cannot afford voice call. Yet their handsets will become outdated in a short time. Therefore, it makes sense to use SMS for not only personal communication but also public performance with a trendy gadget whose color and ring tones enhance the consumer experience.[14] This type of conspicuous consumption and communication is particularly obvious among young migrant workers and students from low-income working families.

But how widespread is the diffusion of SMS in the stratified structure of Chinese society? Admittedly, we do not have empirical data to answer this question fully on the national scale. But it is clear that the technology has connected young users from across the class structure, including members of the working class—for example, among migrant factory workers (Law 2006). Radio and TV stations have been instrumental in promoting SMS across social strata and various social groups as in the reality TV contest, *Super Girl (chaoji nusheng)*, the Chinese version of *American Idol*. In its first season, *Super Girl* drew in more than 8 million SMS votes in a single evening of its finale night (Yardley 2005).

Senior citizens have also begun to text, including my mother living in Wuhan, Hubei Province, who has her full share of technophobic issues, especially due to her poor pinyin (so it is difficult for her to input Chinese characters) and failing eyesight. The reason she uses it is that she has a brother with a hearing disability who lives in southern Jiangxi Province, several hundred miles away, and my uncle, also a pensioner, bought a special handset for the hearing impaired in March 2006. The device is for texting only; it is always set to vibration mode. It thus allows unprecedented translocal connectivity between my uncle and my mother, who has managed to learn texting through her Little Smart phone. In this case, SMS turns out to be a solution that satisfies previously unmet informational needs.

The spread of SMS use has brought structural change to the ICT industry by enabling a new business model. Before SMS, there were few value-added

telecom services, and online content distributors could barely break even with the small revenue generated by Internet advertising or membership fees. The key missing link in China, as in most other developing countries, is the absence of credit cards. But mobile phone plus SMS could be functionally equivalent to credit cards by being a conduit of cash flow. Firms can now send content (e.g., news) and services (e.g., m-tickets that allow ticketing service to be delivered through SMSs) to customers while putting the charge on their phone bill, which users now can pay with their prepaid cash credits or through their monthly statements.

This business model benefits mobile operators, especially China Mobile, because they get the largest chunk of the revenue. But since mobile operators seldom provide attractive SMS content, they need to share part of the revenue with content producers, especially the country's major Web portals and broadcasting stations. The consequence is the emergence of a new industrial complex that integrates mobile operators with content and service providers, from Web sites to mass media, from IT companies to a wide range of traditional services such as fast food and financing, all using SMS as the technological platform (Qiu 2007b). Together they produce a large quantity of content: news updates, jokes, m-coupons (similar to m-tickets but distributed for free), greeting messages, soft porn, promotion of ring tones (*cailing*), multimedia messaging service (MMS, or *caixin*), and different types of advertisements that are sometimes basically spam.

While SMS delivery is automated, the creation and sales of content and the provision of subscriber services entail intensive labor. Key Internet portals thus all have their SMS task forces, known as SMS writers (*duanxin xieshou*), who produce, on a regular basis, large numbers of crisp, sexy texts to be sold or spammed to mobile subscribers. In general, SMS writers are paid poorly, although at times of high market demand like the Lunar New Year, they can make a weekly salary of up to 10,000 yuan (about $1,242) (Lan 2005). It is such new professions of informational labor, with huge disparities in their skill and income levels, that support the explosive growth of SMS, providing a material basis for the formation of China's new working class.

As in the case of Little Smart, telcos embrace SMS because, after being listed on stock markets, they have to strive for higher ARPU. To this end, SMS is not just another data service but a strategic one that serves as a launch pad for other value-added services. By taking full advantage of SMS, content providers like Netease may do extremely well on Nasdaq. For example, in 2003 when the stock price of Netease went through dramatic growth, William Ding, the owner of Netease, became China's richest man

(Xinhua News Agency 2003b). SMS may also help smaller firms attract venture capital or strike better deals when merging with multinational corporations, many of which have entered China's wireless market with plans to acquire promising local start-ups.

A crucial aspect of this industrial complex is its close ties with the authorities. In principle, the telcos are state owned, and, in general, China has shown no attempt to loosen its grip on other content and service providers, including private dot-coms. But the government had not paid much attention to SMS until the 2003 SARS epidemic, when SMS first demonstrated its capacity for alternative information exchange beyond official control (McDonald 2003). Yet once Beijing decided to intervene, it used state-owned mass media, exerted its influence over telcos, and effectively undermined the "rumors" about the pandemic spread of some "strange disease"—although only for a few weeks, until the authorities were forced to confront SARS, now in full swing (Castells, Fernandez-Ardevol, Qiu, and Sey 2006). Despite the change of attitude toward SARS, the Chinese government held its critical stance against those who used SMS to "spread rumors," arresting about a dozen people during the epidemic (Reporters without Borders 2004).

These mobile users could be tracked down, detained, and charged because it is relatively easy to sort and search billions of text messages. SMS have to go through state-owned pipelines, through a gigantic "remote searchable database" (Lyon 2003). Technically, mobile handsets are also more difficult than computers to be reconfigured in order to avoid censorship, filtering, and the "panoptic sort" (Gandy 1993). On the other hand, it is easy for the authorities to produce new regulations against the "abuse" of SMS, given the country's legal and regulatory structures.

The specific instance of "abuse" is often a moving target with notable arbitrariness and selectivity. It could be about "rumors" at one time, and "indecent content" at another (Lanfranco 2005). Yet when a female primary school teacher in a small city in Yunnan Province was sexually harassed by her boss using SMS, the local mobile operator refused to provide legal evidence of the abusive messages (Qiu 2007a). In this peculiar manner, SMS has been transformed into a "wireless leash" for elite-dominated social control over and through the processes of texting.

Does top-down control pose an obstacle to the commercial operation of SMS? The answer is both yes and no. At the beginning, when the MII announced its attempt to rectify sex-related SMS in 2003, just the announcement itself sent the stocks of content providers like Netease into a major slump (Lanfranco 2005). But entrepreneurialism proves to be as malleable as

as the technology itself, responsive to the structural conditions imposed by the authorities, thus adding to the growth of the SMS industrial complex at the conjucture between the state and the market.

A case in point is Venus Info Tech Inc., headquartered in the Zhongguancun area of Beijing.[15] Like UTStarcom, it was founded by former overseas Chinese students, and it has carved out a new market: SMS surveillance. Venus was among the first in China to receive authorization from the MPS to develop a real-time surveillance system for SMS. Its main invention is the Cybervision SMS filtering system, the first of its kind that uses filtering algorithm from the Chinese Academy of Sciences "based on keywords and combination of keywords" (Reporters without Borders 2004).

Free speech observers outside China are concerned about this new censorship system and the SMS surveillance technologies that can be sold and used worldwide. But within China, given the lack of media autonomy and the absence of a strong notion of privacy, such concern has been rarely expressed. Instead, the real issue most mobile customers care about across the board, including both the haves and the have-less, is not free speech or, for that matter, "rumors" or "indecency." It is spam, and the more sinister scams associated with it.[16]

The ubiquity of SMS spam in China stems from a systemic bias toward profit maximization under the circumstances of limited competition between the two mobile operators. Since 2003, landline operators have also started to play a role, with Little Smart phones being able to send and receive SMS. But the predominance of China Mobile continues, and there is little incentive to curb spam from the perspective of content and service providers as well as the telcos themselves.

Abusive spam has gone out of control in dramatic ways. A watershed event occurred during the 2005 October 1 National Day holiday week, when identity theft initiated by SMS affected thousands of mobile subscribers in Beijing (Beijing wanbao 2005). The deception was carried out by groups of spammers in South China who hacked the phone system and pretended to be bank employees and police officers in order to get personal account information and passwords from SMS users. Within a week, millions of yuan were lost, and the crime story made headlines, spurring a sense of crisis regarding spam. Yet the discussions bypassed the fundamental origins of spam rooted in the political and economic structure of the excessively commercialized mobile industry. Instead, the issue was framed to support further state control over SMS. A strict real-name registration system (shimingzhi) of all mobile users was proposed, and an opinion poll

in Beijing found that 75.9 percent of randomly selected respondents endorsed the proposal (Beijing Statistics Information Network 2005).

But despite overwhelming public support, real-name registration of mobile subscribers using their real-world identity has not been enforced, which stands in stark contrast to swift change in cybercafé regulation.[17] The critical difference is the structural positioning of the stakeholders. Whereas cybercafés are largely small, private businesses, SMS content and service providers are on a large scale, and the biggest chunk of profit is taken by publicly listed state-owned corporations. As prepaid services account for the bulk of user growth for both China Mobile and China Unicom, if real-name registration is implemented, a direct impact would be the reduction, or at least stagnation, in prepaid subscriptions. This is obstructed by the mobile operators, who cannot afford falling growth, which will be reflected in the stock markets.

Under such circumstances, a new type of ICP company has emerged that specializes in collecting mobile phone numbers and spamming, with support from the telcos. According to an investigative report by China Central Television, Focus Media is the largest of its kind. At the beginning of 2008, its database contained about half of all mobile phone numbers in China, and it sends out hundreds of million spam SMSs everyday (Southern Metropolitan Daily 2008).

How does all of the above relate to the information have-less and working-class network society? First and foremost, the rise of SMS demonstrates the power of an inexpensive wireless service to penetrate large parts of the Chinese urban society. This is not a high technology, but it nevertheless enjoys high popularity and high growth rates. Behind the boom is the fact that this business could attract talents from across social strata, including working-class groups, and give rise to a model that is more inclusive of have-less users.

Second, like Net bars, this working-class ICT appeals mostly to the younger generation. Although others, including senior citizens and the disabled, are also adopting SMS, youth remain the core user group. This demographic composition influences the ways in which SMS is put to use, for example, through young people's conspicuous consumption and public performance based on texting.

Third, a new industrial complex has materialized to expand the SMS market and deal with sociopolitical issues associated with this market expansion, for instance, during the SARS crisis. The process involves private and public sector actors, including the police. As for the have-less people, it on the one hand creates employment opportunities ranging from

professional SMS writers to blue-collar workers manufacturing SMS surveillance technology. Yet on the other hand, there is underground use, as in the spam scam of October 2005, through which some marginalized members of the have-less population could defy the authorities and stage a temporary revolt.

Finally, as a result of industrial development, a structure of control has emerged to constrain the spectrum of SMS applications. The restrictions affect users in all social strata, although arguably they limit the have-less more than the upper classes in that the former benefit less from the status quo and are therefore more likely to initiate alternative modes of use. In so doing, the chances for independent horizontal networking and new class formation are seriously limited as well. Can SMS exist in something other than the purely commercial settings, as a true working-class ICT, free from spam and other abuse? For the moment, this cannot be answered.

Prepaid Services

Prepaid wireless services enhance user capacity in budget control while allowing mobile operators to reach the have-less population, who would be otherwise unable to afford personal phone service due to low income, the lack of a permanent address, or credit history. For this reason, prepaid services have spread across the world, particularly in developing countries, and become "arguably the most important form of appropriation that caters to the needs of those with lower income and education" (Castells, Fernandez-Ardevol, Qiu, and Sey 2006, 61). China is no exception in this regard. In 2000, its total number of prepaid subscribers was 14.9 million, or 34.6 percent of contract-based subscription. As 2007 ended, prepaid subscription stood at 360.9 million, or 2.1 times that of contract subscribers (figure 3.5).

Other than tremendous growth in subscription numbers, we know much less about prepaid services than other working-class ICTs. This is because of the highly decentralized structure of the market, which is far more complex than Little Smart provided by landline operators or SMS by mobile operators. The statistics in figure 3.5 show only the number of mobile subscriptions. We do not know how many of them are owned by the same individuals or shared among groups of friends. Moreover, besides China Mobile and China Unicom, many companies offer prepaid services, especially VoIP phone cards, such as *Jitong* and Railcom (*Tietong*), which operate nationwide, and numerous smaller regional and local firms. In addition,
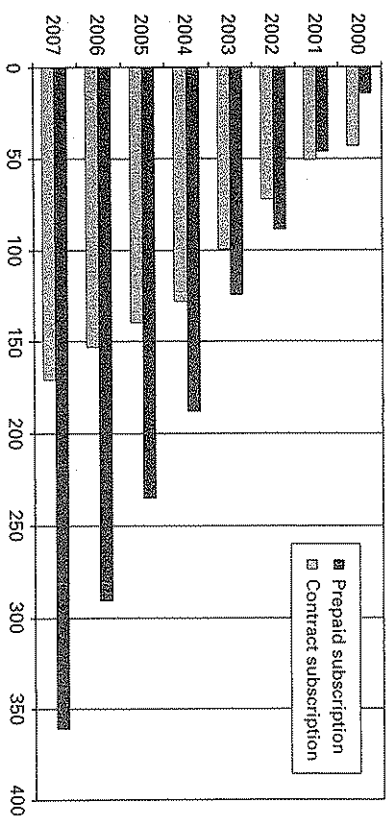
Figure 3.5
Year-end total prepaid subscriptions and contract subscriptions in China's mobile telephone market, 2000–2007 (million subscriptions). *Source:* Compilation based on *China Mobile Annual Reports* (2000–2007) and *China Unicom Annual Reports* (2000–2007).

usually negotiated on the spot. As a result, not only is it difficult to count the exact number of persons buying prepaid services, it is even harder to figure out the total value of the market.

But the flip side of immeasurability is ubiquity. Anyone arriving in any Chinese city cannot fail to witness the sales of prepaid services at all kinds of locations: post offices, newsstands, bookstores, convenience stores, restaurants, and sidewalk vendors. In summer 2002, in a bustling bar street of Chengdu in southwest China, a teenage boy biked past me shouting, "Phone cards! Phone cards!" He carried a schoolbag containing his inventory. Above his back wheel, a cardboard sign flapped, advertising his discount prices. Sales of prepaid phone cards have become a major grassroots ICT business in working-class neighborhoods such as migrant enclaves.

Both the consumer and the supplier aspects of this working-class ICT are important. Prepaid services are not necessarily convenient. In order to save money by using different prepaid packages, subscribers may need to take the SIM (subscriber identity module) card in and out, or they may have to press more buttons to make a call. Most important, the per minute charge may in fact be more expensive than a contract-based subscription. But the key is that this technology is use driven, and one can easily figure out the cost of a call. This mode of working-class connectivity suits the needs of the have-less, for whom income is low and life unpredictability is high.

has), its members would demand and and can afford better telecom service, there is little evidence that pager services are inferior to SMS or even Little Smart, yet another arguably outdated technology that in fact became a huge success after 2003.

The perception of pagers as an obsolete ICT can be better explained from the perspective of the telecom industry—the investors, advertisers, and manufacturers—rather than actual user experiences or the basic information needs of low-end users. The perception is in this sense manufactured as a result of the absence of pager in advertisements that try to sell more expensive *shouji* products. Pagers are viewed as "backward" not because of their technology but because of their low ARPU. Moreover, they are not fully automated; the female operators, as efficient as humans can be, are still no match for machines (as for SMS), and it remains an expense to hire, train, and manage these operators.

Such considerations made sense to companies under the pressure of the stock market to be lean and mean, while concentrating on high-end technologies. This is what happened to Unicom, which owns most pager systems in the country. Between 2000 and 2002, its strategic priority was building and marketing its new CDMA networks so that it could better compete with China Mobile. To do so, investment and personnel were shifted from the pager sector, a fundamental reason for the landslide decline of total pager subscription from 48.8 million in 2000 to 18.72 million in 2002, a startling drop of 61.67 percent within two years (figure 3.6).

While China registers some of the world's quickest growth figures, this is probably one of the largest falls in use in the history of world telecommunications. This is not just about blaming Unicom, although it does bear the most significant consequences of this decline. After spending heavily on CDMA, its market share climbed moderately from 26.7 percent in 2002 to 34.1 percent in 2005, although it still lags far behind China Mobile. Meanwhile, however, it has lost a market of about 50 million customers, or about 40 percent of its mobile subscription base. Not all pager users were upgraded to Unicom's new networks.

The decline of pagers was accelerated by another factor. The market structure was in a sense similar to that of prepaid services in that, under the umbrella of China Unicom, most services were carried out by a large number of regional and local pager operators. Financially they are independent, and each of them has its own team of female operators. Thus, in 2001, when it became clear that the pager market was set to plunge, many of them began to take flight, an act that soon had a network effect, especially among smaller pager

companies. Some of them disappeared overnight as their owners decided to close down.

Female employees in the pager industry, mostly young migrant workers, lost their jobs. Working-class subscribers suddenly found that their pager companies had evaporated, taking with them the advance payments for six months or even a year that they had made. Those funds would never be returned. There was public anger, and indeed some local state agencies, like the Wireless Radio Regulatory Committee of Guangdong Province, attempted to intervene to prevent such irresponsible closings (Wu and Shi 2001). But it was too late, and the reputation of unreliable service, due to the wrongdoings of irresponsible operators rather than the technology itself, had already been slapped on pagers. If companies can act so selfishly and shed their contractual responsibilities so outrageously, which ICT, working-class or not, could be reliable after all?

The cautionary notes from pagers are clear. Networks of working-class ICTs can materialize rapidly due to strong market demand and clever entrepreneurialism. But the combination of the two cannot guarantee the continuation of the low-end service. At junctures of events, especially given the relentless drive for updated technology and higher profitability, working-class ICTs may decline at a speed faster than they had emerged. When this happens, it first hurts have-less subscribers and have-less employees. It also harms the telecom operators themselves with wounds that may not be immediately discernible but are nevertheless painful in the long run. Finally, without effective regulation by the state, the industry, or a third party, the market of a working-class ICT can be fragile. When it starts to dip, it may not just drop, but in fact collapse, and the damage is permanent.

The waxing and waning of pagers poses another important question. After a working-class ICT falls, what happens to its employees? Besides creating new jobs for the information have-less, the rapidly changing Chinese information economy also creates new groups of laid-off workers. Especially vulnerable are the more marginalized groups like female pager operators from the countryside, some of whom were forced into the illegal phone-sex business of "voice-information stations (*shengxuntai*)," as will be discussed in chapter 5.

Shaping Wireless Connectivity

We have discussed several aspects of China's low-end wireless market: the *shouji* handsets, Little Smart, SMS, prepaid services, and pagers. Each of

these different businesses entails a unique mixture of technology, policy, and entrepreneurialism under a variety of institutional structures. They are, however, only the most obvious parts of the whole picture, which contains less quantifiable developments like the sales of used mobile phones and the use of SMS in underground activities, for example, among gangsters. Wireless working-class ICTs also exist in hybrid forms, both with each other (like using prepaid VoIP on top of Little Smart) and with other mediated channels, including mass media as in *Super Girl* and, increasingly, with the Internet. A recent vogue among female migrant workers in Beijing's service sector is mobile QQ service, which transforms *shouji* into a terminal for online chatting (Oreglia, 2007).

The ubiquity and hybrid modes of wireless working-class ICTs in the Chinese city indicate that there are many cost-effective solutions to meet the needs of the information have-less. Wireless communication has already offered innovative modes of connectivity from the bottom up, creating tremendous opportunities for low-end telecom markets to prosper in ways previously unimaginable. These wireless working-class ICTs have emerged over the past few years at the lower strata of the Chinese network society. In so doing, they have sent ripples across the information sector from equipment manufacturing to content provision to service delivery, causing structural change whose impact can be felt in the wireless market worldwide.

A notable feature across the board is the increasing linkage with the international marketplace in terms of not only technology transfer (Little Smart) and capital flow (SMS) but also large-scale imports and exports of manufactured equipment, especially *shouji* handsets. Without the overseas factor, wireless ICTs would have been less successful in providing working-class connectivity within China, as well as blue-collar job opportunities for new sectors like handset manufacturing, whose output depends heavily on export. Therefore, compared to the traditional model of telecom service under the state monopoly of MPS, an internationalized market mechanism with some internal competition proves to be much more responsive to the informational needs of have-less populations.

Nevertheless, only a fraction of China's telecom players are truly inter-national. As a whole, the new industrial system of wireless working-class ICTs still depends on state support in significant ways. Although there are sporadic crackdowns on black *shouji* and SMS scams, the suppression is nothing comparable to what was inflicted on cybercafés. The low level of top-down intervention seen in this comparative light is a key reason behind the booming wireless sector at the local level.

But are wireless working-class ICTs guaranteed to succeed in a market-place dominated by the commercial logic? The decline of pagers offers the strongest counterargument, while the crisis of market failure also looms, to a different extent, in the handset manufacturing industry with its huge surplus production capacity, the premature decline of Little Smart in recent years, and the incapacity of the market itself to eradicate spam. Commer-cial motivation may also play a conservative role by succumbing to systems of social control and the top-down imposition of upper-class interests, for example, by making SMS filtering and surveillance systems for censors in China and other countries. This ultimately narrows the range of possibili-ties for the social uses of wireless working-class connectivity.

Finally, a fundamental challenge comes from the drive of various telecom players to upgrade their technologies to high-end ICTs, more expensive value-added services, and ultimately higher ARPU. This is essentially what happened to Little Smart, SMS, and pagers. Thus, the wireless ICTs dis-cussed in this chapter are not much different from cybercafés: both need an appropriate balance of public policy and commercial rationale in order to be sustainable. After all, working-class network society is not about the shaping of technology into instruments of accelerated capital accumula-tion. Rather, it is about the long-term well-being of people, now built on the materialized technosocial networks of working-class ICTs.

II The People of Have-Less

4 Migrants

Migrants are people with high mobility. They constitute an essential part of the information have-less population that provides the basis for the formation of working-class network society in urban China. There are many kinds of migrants, from all over the country, in all walks of life. In recent years, especially since China's central government demanded fair treatment of migrant workers in January 2003,[1] there have been numerous books and reports on peasant workers (*nongmingong* or *mingong*) who leave the countryside to work in cities. For the discussion here, the term *migrants* more broadly includes a variety of industrial workers, service sector employees, and small entrepreneurs, including laid-off former state sector workers as well as other underemployed laborers in the Chinese informational city. Many of the jobless end up in informal and illegal economies, in China and abroad.

Because no agency keeps a full tally of the various kinds of migrants, an estimate of China's floating population ranges from 98 million to 200 million; a more precise figure from the National Statistics Bureau in 2005 was 147.35 million: 47.79 million interprovincial and 99.56 million intraprovincial migrants (*China Population Statistics Yearbook* 2006, 3). In comparison, the world's total number of international immigrants stands at roughly 96 million (ILO, 2002). In other words, there are more migrants within China than those migrating across national boundaries in the entire world.

Most of China's domestic migrants are have-less migrants: they are socioeconomically similar, have the shared experience of being uprooted, and hold common aspirations for human settlement and sociocultural recognition for what they achieve through long-term or temporary migration.

These migrants have come to rely on working-class ICTs for communication. These devices now constitute "the key technological development"

in the context of China's "new urban mobility" (Cartier, Castells, and Qiu 2005). The spread of low-end technology services like Internet cafés and Little Smart, in turn, triggers, sustains, and conditions the ongoing migration process.

Working-class ICTs are not just gadgets; they also serve as a set of social, cultural, and political conditions running through migrant populations. ICT connectivity may empower migrants in pursuit of personal objectives. But it may also subject them to new systems of control, exploitation, and alienation and other ways of disempowerment by service providers, employers, or state actors, at work or at home.

Have-less migrants, however, are not only passive end users who are isolated from each other. They include small ICT business owners who know their neighbors well, as well as grassroots content contributors such as migrant worker bloggers, who have fans across the nation. Networked connectivity exists even for many poor migrants who can afford only public pay phones to keep old contacts while forging new bonds. This is a process that highlights the capacity of collective units like household, kin, and peer groups to survive social upheaval and remain functional through their translocal networks, now maintained and extended pri- marily by working-class ICTs.

Like middle-class social networks, the translocal network of have-less migrants forms an intermediary layer of negotiation, strategizing, and adjustment among its members so that they can act together in response to rapid change. Translocal networks are "networks that reflect multiple place attachments resulting from migratory lifepaths" and were "tradition- ally maintained through face-to-face communication, postal mail, and telegraph" but now "find convenient and more efficient expression via have-less ICTs" (Cartier, Castells, and Qiu 2005, 24). Translocality has been a central element in the social life of traditional China (Oakes and Schein 2006), and today the use of ICTs strengthens the existing propensity toward translocal networking. The result is not always socially uplifting because collective decision making may fail to yield practical results or produce unintended consequences, including in-group tension and con- flict. Whatever happens, these are social processes with all the richness and complexity of human communication. Have-less migrants, thus construed, are interrelated human beings rather than isolated economic animals or rootless floaters (mangliu).

Working-class ICTs and translocal networks are also situated within macro social conditions, shaped and constrained by existing urban institu- tions. Urbanization and industrialization, both occurring in an era of

globalization, have a direct impact on new mobility patterns. This chapter first provides an overview of these macrocontexts before examining the more specific relationship between have-less migrants and their working- class ICTs, focusing on the relationship between empowerment and net- worked connectivity. It then discusses variations among have-less migrants by gender, ethnicity, and regional identity and their translocal networking through working-class ICTs.

Besides secondary data and fieldwork, this chapter also draws findings from six survey groups conducted in 2002 and 2006. A survey group com- bines quantitative and qualitative methods with participatory empower- ment design and action research (see the methodological appendix). It serves as an important empirical basis for this chapter and the next, which focus on relatively marginalized groups that cannot be studied adequately using conventional methods.

Urbanization and Industrialization in the Global Age

Cities are centers of flows—of people, goods, and information. The growth of cities necessarily boosts mobility, thus increasing the demand for infor- mation (Meiers 1962). Urbanization, especially in industrializing societies, is often characterized by the emergence of a working class that is seeking more inclusive means of communication. At times, this demand is answered by entrepreneurs who deploy new technologies and create new business models for cheaper modes of information delivery. Historically this was how the penny press emerged in mid-nineteenth-century New York and how television became a popular medium after the 1970s in industrializing Asian societies like Hong Kong. In China today, a similar process is under way as massive urbanization and industrialization are accompanied by the rise of working-class ICTs.

How does Chinese urbanization happen, and with what mobility pat- terns? Does the increase of migration suggest a retreat of the state, allowing more autonomous grassroots communication? China is late in experienc- ing urban growth. When Third World urbanization took place globally in the 1960s and 1970s (Castells 1977, Drakakis-Smith 1987), China was relocating people from cities to the countryside. During the Cultural Revolution, the urban population dropped from 17.86 percent of the Chinese population in 1966 to 17.44 percent in 1976.[2]

But in post-Mao China, urbanization accelerated at an extraordinary rate (table 4.1). Within a quarter-century, the State Council designated 469 new cities. The number of large cities with more than 1 million residents grew

Table 4.1
Urban growth in China, 1978–2005

	Total number of cities	Number of cities with more than 1 million urban residents	Urban population (millions)	Urban population as a percentage of total population (%)	Total territories of city areas (km²)
1978	192	13	172.45	17.92	—[a]
1990	467	31	301.95	26.41	120,800
2000	663	90	455.94	36.22	441,200
2005	661	113	561.57	42.99	580,055

Sources: Compilation based on *China Population Statistics Yearbook* (2006), *Yearbook of China's Cities* (1991, 2001, 2006), and *China City Statistics Yearbook* (1991, 2001).
[a] Data unavailable.

from 13 to 113. The urban population rose from 17.92 percent of the national population to 42.99 percent. Natural increase is only a small part of this. Given the one-child policy and declining birthrates in metropolitan areas, the additional urban population—nearly a quarter of all Chinese—is overwhelmingly from the countryside.

Urban growth also engulfs rural villages at the edge of cities, as shown by the expanding territories of city areas in table 4.1. Although the total number of cities has stabilized since 2000, still 138,855 square kilometers were added to urban territories by 2005, an increase of 31.5 percent. Therefore, these former rural areas being swallowed by cities are now large enough to accommodate new arrivals, thus creating migrant enclaves known as urban villages (*chengzhongcun*).[3] The expansion entails new infrastructures like roads, telecoms, water, and electricity systems, hence producing jobs for have-less migrants. Meanwhile, the enlarged city territories, overburdened with traffic and construction sites, are more difficult to traverse. This adds to the popularity of working-class ICTs among migrants, who need to retrieve information about jobs and housing, contacting families and friends, and coordinating everyday activities in the city.

The spatial expansion of cities precipitates the conversion of agricultural land into real estate, factories, parks, and reservoirs, hence forcing entire communities off their traditional land. The Three Gorges Dam alone will displace at least 1.5 million people by 2009 (*Yangtze River Archives* 2005). In other cases, land takings have caused so many conflicts and even bloodshed that it is not an exaggeration to call this a Chinese Enclosure Movement. In sum, Chinese cities have become more numerous, more populated,

Table 4.2
Distribution of urban employment by enterprise ownership (millions of employees)

	State ownership	Collective ownership	Private and individual ownership	Foreign ownership[a]	Other ownership[b]	Total
1978	74.5	20.5	0.2	—	—	95.1
1990	103.7	35.5	6.7	0.7	1.0	147.3
2000	81.0	15.0	34.0	6.4	13.4	149.8
2004	67.1	9.0	55.2	10.3	23.0	164.5

Source: Compilation based on *Almanac of China's Population* (2005).
[a] includes enterprises owned by Hong Kong, Macau, Taiwanese, and all foreign entrepreneurs.
[b] includes joint ventures, shareholding companies, joint shareholding companies, and limited liability companies.

and significantly larger than before, with the personal consequences of urbanization being disproportionately shouldered by have-less migrants.

An equally profound change is the restructuring of urban employment. As discussed earlier (see figure 1.2), the privatization of employment provides a key precondition for growing informational needs among the have-less. As shown in table 4.2, in 1978, almost everyone in Chinese cities worked for state or collective ownership work units (*danwei*), which provided stable jobs and benefits, taking care of workers and their families.[4] But the old socialist model has been decisively eroded, with more people today working for private and foreign enterprises.

Indeed, have-less migrants have gained more mobility, although state policy still matters. The privatization of employment is itself a result of state policy that ended up with more than 30 million laid-off workers between 1989 and 2004 (Hurst 2004), another large addition to the social category of have-less migrants. As table 4.2 shows, between 1990 and 2004, 63.1 million urban employees left the state and collective sectors. Some laid-off workers may be reemployed in their home cities. But to most of them, like those in the rust belts of northeast China, being laid off means the beginning of migration. Like rural-to-urban migrants, laid-off interurban migrants depend on working-class ICTs for information and networking, and in many cases for their own businesses because many of them become microentrepreneurs, selling inexpensive products like prepaid phone cards.

The role of state policy is manifest if we consider factors like the revocation of food rations (*liangpiao*, or food stamps that people had to use to buy food until early 1990s), the loosening of the *hukou* residence registration system that restricted population mobility to a single locale, and the opening up of coastal regions to both internal migration and foreign investment. Without these state decisions, both migration growth and urbanization would have been slower. Power was then decentralized, primarily to local governments and entrepreneurs with personal ties to local officials (Hsing 1997, Oi 1992) rather than to members of the working class at the grassroots level. It is essential to examine individual decisions about migration and ICT adoption in the context of urban transformation.

China's contemporary industrial revolution, like the one in England two centuries ago, has brought about a fundamental restructuring of the economic system and of society itself. This process of industrial growth has Chinese characteristics, of course, but it also epitomizes social transition in a global era when the entire world feels the impact of the transformation of a great nation.

Since China joined the WTO in 2001, we have heard much about the country's trade and investment issues and state policy. The picture is yet another East Asian economic "miracle" built on the joint forces of foreign capital, global trade, and China's unparalleled labor pool and enormous market. What is lacking in this portrayal is, first, the recognition of multiple ties between industrialization during the current phase and the earlier Maoist era. From 1949 to 1979, China's gross industrial output grew from 14 billion to 459.1 billion yuan, an increase of about thirty-two times over thirty years,[5] the result of the CCP's focus on industrialization.

Industrialization under Mao, characterized by central planning and the proletariat ruling class, of course differs from China's industrialization today. Industrial output during that period in history was primarily for domestic consumption, since China was much more isolated from the rest of the world. But there are notable legacies from Mao's era that have facilitated industrialization since 1978. The old socialist state trained large numbers of scientists and engineers, including China's strategic weaponry designers, organized through "open, flexible, networked-based management methods" (Feigenbaum 2003, 6), who played a major role in China's industrialization after the 1980s. Among China's power elite, almost everyone agreed that China had to modernize and go beyond its millennia-old agrarian economy. Industrialism took deep institutional roots, which explains the widespread focus today on high growth in manufacturing as well as the easy acceptance of informationalism as ideologically desirable.

Second, industrialization in the Third World context is nothing new. This is in fact a mirror process of postindustrialization in First World countries, through which blue-collar jobs are relocated to countries with lower labor costs. The relocation is, however, uneven and unstable. During the Cold War, many developing countries attempted to industrialize, usually with help from either of the superpowers. There were many such instances from Asia to Africa to Latin America; only a small number were successful, and most of them are adjacent to China.[6] These are the newly industrialized economies (NIEs) of Hong Kong, Taiwan, Singapore, and South Korea, all significantly influencing China's industrialization and forming a regional dynamic that continues to influence the path of industrialization in China today (Cartier 2001). A result of this regional dynamic, which reflects global restructuring, is the concentration of labor-intensive, export-oriented industries in coastal China.

Since the beginning of economic reform in 1978, China's secondary sector, consisting of manufacture and construction, grew faster than its national economy. Consequently, the percentage of people employed in the secondary sector increased from 17.3 in 1978 to 25.2 in 2006 (table 4.3). However, the GDP share of the secondary sector increased by only 0.5 percent over this period and its employment share by 7.9 percent. Although these are significant changes on top of the rapid expansion of the national economy, the patterns here are not the overall industrialization of the fundamental structure of economy. Still, manufacturing and construction account for only a quarter of China's total workforce.

Why are so many people around the world today feeling China's rising industrial power? Isn't the country actually becoming a "world factory"? There are several answers to these questions, including the size of China, for it simply takes longer to transform a large economy, and a single-digit change in China's labor distribution can have significant global ramifications.

Structurally, the impact of industrialization is most obvious in the primary sector (i.e., mostly agriculture in the Chinese context), whose share of employment decreased from 70.5 to 42.6 percent between 1978 and 2006. This means that more than a quarter of China's total labor force—the size of all employment in the United States—has migrated from the primary sector. After leaving agriculture, most of these overwhelmingly blue-collar laborers joined the tertiary or services sector, whose share in total employment almost tripled. Although the tertiary sector continues to absorb labor from agriculture, its GDP share has not been increasing at a comparable speed. This indicates that the new service jobs do not

Table 4.3
China's GDP and employment: Total amount and percentage shares of the primary, secondary, and tertiary sectors

	Total amount		Primary sector (%)		Secondary sector (%)		Tertiary sector (%)	
	GDP[a]	Employment[b]	GDP	Employment	GDP	Employment	GDP	Employment
1978	362.4	401.5	28.1	70.5	48.2	17.3	23.7	12.2
1990	1,854.8	647.5	27.1	60.1	41.6	21.4	31.3	18.5
2000	8,946.8	711.5	15.9	50.0	50.9	22.5	33.2	27.5
2006	21,087.1	764.0	11.8	42.6	48.7	25.2	39.5	32.2

Sources: Compilation based on *Almanac of China's Economy* (1981–2005) and J. Li (2005).
Note: The primary sector includes such economic realms as agriculture, forestry, fishery, and husbandry. The secondary sector encompasses all industrial activities, from manufacture and construction to chemical and energy industries. The tertiary sector, also known as the service sector, includes businesses like retail, entertainment, telecommunications, healthcare, banking, and legal services.
[a]In billion yuan.
[b]In millions of employees.

necessarily contribute to higher productivity. China now has more lawyers and engineers than before, however, they constitute only a small portion of the new tertiary-sector jobs. But when it comes to the majority of the new jobs for have-less migrants, most become waitresses, janitors, taxi drivers, security guards, or street vendors.

Most important, the growth of the service industry in China does not imply postindustrialization. Instead, it is a centerpiece in China's current phase of industrialization, which encompasses transportation, marketing, advertising, and telecommunications. These are not manufacturing jobs per se, but they were the weakest link of Maoist industrialism. These services allow Chinese firms and the new working class to participate in the global economy on a massive scale.

The composition of China's trading commodities demonstrates a clear pattern of industrialization (table 4.4). Today China's exports and imports are primarily industrial goods: raw materials, parts, and semiprocessed or fully processed products for the secondary sector. High ratios of industrial goods in both imports and exports mean that China's industrialization is highly dependent on external partners for both the input of resources and market output.

When foreign investments arrive in China, they concentrate on the most profitable sectors, thus giving rise to unbalanced development, which further alters the economic structure. One such sector is electronics, which has been remarkably transformed as industrial leadership has shifted from

Table 4.4
China's participation in the global economy: Imports and exports, foreign direct investment, and share of industrial goods

	Total imports and exports[a]	Exports value[a]	Trade surplus[a]	Foreign direct investment[a]	Industrial goods as a percentage of total exports	Industrial goods as a percentage of total imports
1980	38.1	18.12	−1.9	—[b]	49.7	65.2
1990	115.4	62.09	8.7	3.5	74.4	81.5
2000	474.3	249.21	24.1	40.7	89.8	79.2
2006	1,760.4	968.9	177.5	73.5	94.5	76.4

Source: China Trade and External Economic Statistical Yearbook (2007).
[a]Billions of U.S. dollars.
[b]Data unavailable.

qualitative methods like ethnography, in-depth interviews, and focus groups, which tend to be relatively weak in identifying general patterns across the population. Quantitative research is equally problematic because census and other official data usually do a poor job of including have-less migrants, especially their media communication patterns. Although researchers can carry out surveys, sampling remains a major challenge because probability sampling is often impossible (Manion 1994). Consequently, most surveys about migrants and media are based on a one-shot convenience sampling design (Cao and Liu 2006).

I tackled this problem using a survey group design that combines quantitative and qualitative methods with action research, which provides the basis for more general discussions about the diffusion of working-class ICTs and media empowerment among have-less migrants. Each survey group consisted of three to five young migrant workers whom I hired from the labor market as survey administrators. Over four days, we worked closely together on a survey about the uses and perceptions of ICTs. This process helped build rapport among team members and empowered migrants to become grassroots opinion leaders, who then spoke out in a focus group at the end of the survey period (see the details in the methodological appendix).

Six survey groups were held in two waves in 2002 and 2006, in Guangzhou, Shenzhen, and Zhuhai in the Pearl River Delta of Guangdong Province. Although this was not a national sample and was still based on purposive sampling, the design ensured quality data by empowering migrants and building up the group dynamics. Rogers and Singhal (2003), wrote that "the empowerment process fundamentally consists of dialogic communication. Individuals gain a belief in their power to achieve desired goals through talking with others, particularly peers . . . especially in small groups" (82). The result of this work was a rare data set that reflects change over time in this crucial region of South China that not only attracts the largest number of migrant workers but also plays a key role in China's export-oriented ICT industry.

Most survey group participants were young female migrants earning an average monthly income of 1,400 yuan (about $170) or no income because they had just graduated or were between jobs. After I cleaned up the data, the survey group consisted of 390 migrants (184 in 2002 and 206 in 2006), with about equal numbers of males and females. On average, these respondents were young (their average age was twenty-five), they earned about 1,350 yuan ($165) per month, and they had a high school education. They typically had lived in the city for three years, working in factories, at construction sites, or as sales personnel, clerks, and servers.

Table 4.7
Diffusion and monthly expenses of working-class ICTs among migrants in Guangzhou, Shenzhen, and Zhuhai

		Internet	Mobile phone	Home phone
Average monthly expense (yuan)	2002	108.8	242.0	157.5
	2006	96.2	111.2	27.9
Percentage change		-11.6	-54.0	-82.3
Diffusion (%)	2002	49.5	58.2	43.5
	2006	76.7	83.5	25.2
Percentage change		27.2	25.3	-18.3

Table 4.7 summarizes the trends about ICTs and have-less migrants. The overall change from 2002 to 2006 demonstrates two basic patterns. First, the cost of ICTs decreased significantly: the Internet fell by 11.6 percent, mobile phones by 54 percent, and homes phones (including landline phones at home and Little Smart) by 82.3 percent. Second, ICT diffusion greatly increased for most ICT services (the Internet by 27.3 percent and mobile phones by 25.3 percent) except home phones, which fell by 18.3 percent. This pattern of falling costs coupled with rising diffusion was identified in focus groups and field observations as well, although table 4.6 shows the specifics using comparable data collection methods in 2002 and 2006.

By 2006, large percentages of have-less migrants could use the Internet (76.7 percent) and had their own mobile phones (83.5 percent). If counting other forms of ICT connectivity such as landline phone at work, pay phone, and pager, only two respondents in 2002 had no ICT connectivity. In other words, the overwhelming majority (98.9 percent) of migrants surveyed in 2002 and everyone in 2006 had some form of connectivity.

The data reveal unique patterns of ICT diffusion among have-less migrants. Official statistics at the national level report home connection as the most important Internet access among Chinese netizens, followed by access at work (CNNIC, 2002, 2006). But in this sample, home access was used by only 17.5 percent of migrant Internet users, of whom 26.2 percent also went online at work. The most prominent method of Internet access was the cybercafé, accounting for 77 percent of Internet users in this sample.

While asked how they learned to go online, 46.5 percent of these migrant netizens identified the cybercafé, by far the most important place for

first-time Internet users among migrants. Cybercafés are popular due to their low cost. Because most of these have-less migrants tend to have low incomes, little technical knowledge, a small place to live, and a highly mobile lifestyle, the cost of having their own personal computer would be prohibitive.

Cost has a similar effect for mobile phone diffusion. Between 2002 and 2006, the price for mobile handsets and per-minute charges dropped significantly. Have-less migrants could select from many more service packages in 2006 than they could in 2002, including prepaid services. Between the two phases of the study, the most significant change was the upsurge of SMS users from 13.1 percent of mobile phone owners in 2002 to 95.4 percent in 2006. On average, each respondent sent 12.5 SMSs every day in 2006. Price advantage was a main reason for this upsurge, which in turn drove up mobile phone penetration.

However, cost was not the only factor, as shown by the data on home phones. There was a dramatic price drop of 82.3 percent between 2002 and 2006 due to competition from low-end mobile services and the introduction of Little Smart wireless phone (counted as part of the home phone market in the official regulatory system). Yet the total uptake of home phone services still fell by 18.3 percent. As I learned in the focus groups, the decreasing popularity of home phones had to do with the poor perception of the service quality of Little Smart and the discriminatory treatment of migrant customers by the telcos. The increasing affordability of mobile services was another important reason for the decline of home phones. The focus groups revealed that home phones were used mostly for local calls; higher-income migrants tended to place long-distance calls on their mobile phones and lower-income migrants tended to do so using pay phones. As population mobility continues to rise, migrants have a greater need for long-distance calls rather than local calls only.

We can see that the diffusion of working-class ICTs is a complex process that involves both economic and noneconomic factors, above and beyond the technologies. While the general trend of falling prices and rising adoption can be observed, specific patterns vary depending on market dynamics as well as decision making by individual migrants.

After ICT adoption, how do have-less migrants use and appropriate these working-class modalities of communication? As mentioned in chapter 1, typical practices of working-class connectivity include going online at a cybercafé and using a pay phone, Little Smart, prepaid services, or SMS instead of mobile voice call. These distinct modes of networked connectivity are shaped to meet particular goals based on the broadly defined

informational needs of have-less migrants as well as popular perceptions of ICTs that sometimes stem from the messages of advertising.

A common ICT practice among have-less migrants is the wide spread of QQ, a successful Chinese online chatting service. QQ can be accessed using computers and, increasingly, mobile phones. It is the most prevalent platform for online personal communication among migrants, most of whom do not have an e-mail address even after going online regularly for years. Unlike MSN Messenger, which is used more by white-collar professionals, QQ allows users to chat with strangers outside their existing social network. Yu, for example, is an office clerk from Guizhou and worked in Zhuhai for five years. In a 2002 focus group she was proud about the friends she had made through QQ: "My Net friends are all super. There are many questions about the Internet that I don't know. I go online to chat with them and they are always helpful. . . . The first time [I asked people questions online] was when I began to use QQ chatting, when I went home [in Guizhou] for the Chinese New Year. I was bored. So a friend got me started using QQ, which was actually quite simple. After I came back [to Zhuhai], I found out that many of my friends here were also using it [laugh]." In this case, existing social relationships functioned as a basis for the extension of Yu's network in cyberspace. The Net friends helped Yu learn more about the Internet. They also include Yu's friends in Zhuhai, thus facilitating her integration in the destination city.

Because survey group members were recruited from local labor markets, they were eager to discuss the role ICTs play in job hunting. A consensus was reached that the mobile phone is indispensable to finding a job. But when asked who actually received calls from future employers, most groups failed to give specific examples except one Guangzhou group. A participant in Zhuhai said, "Gee, I never thought about this. No boss ever called my mobile phone. But I always feel I can't find a job without it!" According to the survey groups, the most useful employment information still came from traditional interpersonal networks.

An unexpected but recurrent theme in discussing their job-hunting experiences was about the potential danger associated with ICT connectivity rather than the actual employment opportunities. In all six groups, participants talked about various ways of cheating—for instance, by posting fake information on human resources Web sites and sending scam SMS or QQ messages to job seekers usually asking migrants to pay a fee to secure a job. A Guangzhou migrant said, "They can cheat more people because now they no longer need to see people face-to-face [due to the technology]." Another respondent in Shenzhen who was victimized exclaimed,

"Shenzhen is full of cheats—in the job market, in the streets, and on the Internet!"

The most striking observation from these discussions is the high level of awareness among all survey group members of the potential dangers of ICT connectivity. Even those who appeared to be shy became articulate in talking about these dangers; knowing how to prevent a scam is essential for have-less migrants in labor markets.

Another prominent topic is the entertainment function of working-class ICTs, especially of cybercafés, which serve mostly young migrants. Why is entertainment content so important to have-less migrants? It in fact has little to do with their low income or low levels of education since entertainment is a basic media function, even for the upper classes. However, entertainment, especially commercial entertainment, is magnified by service and content providers. As one participant in Shenzhen disclosed in 2006, "I want to read more news but it's hard to find it on the Web sites I know. They are all full of commercials."

The general lack of news is only the tip of iceberg. Underneath the seemingly endless choices of entertainment programs and content, it is in fact difficult for have-less migrants to find a wide range of basic information that they need, especially if the information delivery is not profitable for the service or content providers.

Even so, the most frequently used adjective in all group discussions turned out to be *convenient*: "The Internet is really convenient." "Mobile phone makes everything convenient." "SMS, that's so convenient indeed." The perception of inconvenience is then used to discredit other "outdated" services such as pagers: "Who still uses the pager? It's so inconvenient!" This is a common response in discussing this outmoded working-class ICT.

The only exception was a female insurance representative. Responding to others' critiques on pager use in 2002, she said, "Pagers are in fact not that inconvenient. You can see who's trying to find you, and then you decide if and when you want to call back. It saves mobile phone expenses. It was quite helpful to me." This exceptional comment was buried in widespread perceptions among other members, not too different from elite perceptions, that the latest, more expensive ICTs are more "convenient" and the older ones needed "upgrading." While the practices of working-class ICT connectivity vary significantly from upper-class practices, the two may converge at the perceptual level.

The mismatch between practice and perception can best be found in the comments migrant participants make about the mobile phone. For most

of them, the mobile phone is the most expensive item that they have ever purchased. It is also the most important status marker for their new-found urban identity. But the device and monthly expenses were expensive in 2002. In 2006, the handsets became more affordable, but the cost of calls was still very expensive for most migrants. One of them confessed, "We can buy a mobile but can barely feed it [can barely pay the phone bill]."

A more extreme pattern was disclosed by Xiao Wu, a male participant: "I know people who were broke in Shenzhen. They had to sell their phones to some private boss to have the money to go home." The mobile phone in this sense is not only an indicator for modern urban identity. It is also the last ticket for have-less migrants to get out of the city.

Empowerment can happen on multiple dimensions—economic, social, cultural, or political. For our purposes here, empowerment is "the process through which individuals perceive that they control situations" (Rogers and Singhal 2003, 67). To explore the effects of working-class ICTs on empowerment and disempowerment requires looking at three key variables. First, migrants' socioeconomic status (SES), measured by income and education, represents an internal stratification among have-less migrants. Second, ICT connectivity, taking into account the ownership and uses of Internet and telephone connection, represents empowerment because it indicates the inclusion of have-less migrants in an active network of two-way communication. Third, the percentage of migrants' monthly income spent on working-class ICTs represents disempowerment for those who lose control over their budget.

The results of correlation analysis, controlling for respondents' gender, age, and residential tenure, show that have-less migrants with higher SES enjoy higher ICT connectivity. The relationship is rather strong, with a coefficient of .53 ($p < .001$). This should be no surprise: migrants with more financial and educational resources tend to own more ICTs and use them most frequently and longer. However, better-educated migrants with more income do not necessarily have more control over their ICT budget. The relationship is very weak between SES and the percentage of income being spent on ICTs (coefficient = .04, $p > .05$). This is true for both males and females, in all age groups, and groups with different residential tenure in the host cities.

Finally, migrants with higher ICT connectivity tend to be more likely to lose control over their ICT budget (coefficient = .34, $p < .001$). This is in a way counterintuitive because those who are more empowered in ICT connectivity also tend to be more disempowered in terms of commercial

alienation in using ICTs. However, it is also understandable because high-connectivity migrants, regardless of their SES, tend to develop more dependence on ICTs. This dependence may stem from their realistic needs, such as retrieving work- or family-related information, but also from perceptions promoted by advertising and marketing campaigns, imposed by peer group pressure, or internalized as personal desires for a "modern" and "urban" lifestyle, if not pure vanity. This means that while ICT connectivity creates openings for empowerment and upward social mobility, it also paves the way for alienation and disempowerment in the context of an overwhelmingly commercialized urban society.

Internal Variations

A basic finding from this analysis is that have-less migrants are not a single homogeneous group in terms of their socioeconomic positioning and ICT connectivity. Instead, there is significant internal variation, which this section examines more closely along the lines of in-group stratification, gender, ethnicity, and regional identity. Existing research on the internal variation of have-less migrants is uneven. Although many studies are concerned about peasant workers (nongmingong) and "working sisters" (dagongmei or young female migrant workers), empirical data remain patchy and incomplete regarding the groups and subgroups. The purpose here is to explore the characteristics of differentiation among have-less migrants based on what is known from previous studies and my own fieldwork. Important is to note that scrutinizing internal differentiation here does not preclude the formation of a new working class among have-less migrants or imply that the divisions, all of which time honored, will exist only in the short run.

In-Group Stratification

The first basic variation is in-group stratification, which has to do with not only socioeconomic status but also the cultural and political positioning of have-less migrants. When China's massive migration began in the 1980s, the class composition of migrants was more homogeneous: the majority were rural-to-urban migrants who found jobs that city dwellers would not take. After twenty years, the situation has changed with the increase of interurban migrants, laid-off workers, and more internal stratification among rural-to-urban migrants.

Today we can find migrants in almost every stratum of the urban social hierarchy. A tiny proportion of them have worked their way up from the

have-less position to the upper class, at least in a strict economic sense. These are usually diligent and entrepreneurial individuals who joined the market economy early on. In other cases, have-less migrants may have picked up skills in the destination city through training or self-learning and entered the white-collar world as clerks, technicians, salespersons, and managers. In Foshan, Guangdong Province, more than sixty thousand have become technicians and managers in local enterprises (Cui 2004a). In this and other cities with large migrant populations, night schools prosper by teaching word processing, foreign languages, and other skills for finding nonmanufacturing jobs. Although working in a low-end white-collar position does not guarantee a higher income, it does confer more prestige and more opportunities to move up the social ladder.

There are also self-employed migrants with small businesses who make enough just to feed their family. These are the average shopkeepers who run restaurants, convenience stores, and newsstands, selling all kinds of products, including domestic-brand handsets and prepaid phone cards. They make up a large proportion of the expanding tertiary sector. Although it is common for these microentrepreneurs to have some employees, most of them still do some manual work. Nevertheless, much of their income and social status are derived from their ownership of the business rather than the manual work itself.

Nevertheless, the majority of have-less migrants are still overwhelmingly laborers who rely on performing manual labor at low wages. This group is China's new blue-collar industrial workers, consisting mostly of migrants from the countryside and, to a lesser extent, state and collective sector workers, many of whom were laid off in recent years. In such industries as coal mining and urban construction, employees almost exclusively have rural origins. In manufacturing and transportation, the proportion of laid-off workers can be higher, although an even larger portion of them tend to enter the service sector by starting small businesses like cybercafés.[9]

Blue-collar workers are also internally stratified, with some of the more skilled ones becoming labor aristocracy, such as those who operate sophisticated machinery.[10] These skilled manual workers are usually well paid and may have a range of employment benefits. Despite the absence of unions, these benefits are likely to be maintained and perhaps improved because Chinese industries are becoming more capital intensive and skilled manual labor is in short supply.

Yet the great majority of blue-collar workers are highly exploited. Zhang Li's study in Beijing found that in small family-owned garment businesses, female workers commonly toil more than fifteen hours a day using a

sewing machine (L. Zhang 2001). Pun's ethnographic research conducted in a computer factory in Shenzhen revealed that a day-shift "working sister" is usually on the production line from 8:00 A.M. to 9:00 or 10:00 P.M. except for short lunch and dinner breaks (2005).

At the national policy level, the most prominent issue is the delay in paying migrant workers. This was highlighted in 2003 when Premier Wen Jiabao demanded that all overdue wages be immediately paid (H. Lu 2005). The central government has taken important measures to protect workers' rights, although policy implementation at the local level remains uneven. Despite this increased attention to unpaid wages thanks to the prolabor policies of the Hu-Wen administration, other problems persist. Most migrant workers still have few employment benefits as required by law. Waitresses are often not allowed to use landline phones in restaurants. And assembly line workers are often forbidden to bring their mobile phones to work.[11]

In more basic terms other than the right to communicate, sweatshop owners often confiscate migrants' personal identity cards to prevent them from leaving. Even worse, some workers were fired when they become older and could not move so quickly or were disabled. According to a report by the Shanghai Academy of Social Sciences, each year about forty thousand fingers are either cut off or crushed in factories in the Pearl River Delta alone, mostly during assembly line operations for the export business (Barboza 2008a). Yet in this region, it takes an average of 1,070 days for workers to claim compensation for work injuries (China Labor Watch 2007). This is yet another manifestation of the personal consequences of industrialization and globalization that are disproportionately borne by have-less migrants. It has led to rising informational needs among migrant workers in order to seek legal protection. This demand provides a social basis for the formation of new working-class networks and the emergence of network labor.

Besides the traditional strata of white-collar and blue-collar work, the rise of China's ICT industry is blurring the division of labor between manual and nonmanual work, and between disposable generic labor and valued self-programmable labor as identified in the original framework of network society (Castells 1998). This recent development in Chinese informational-ism is best exemplified by the growing importance of gray-collar (huiling) workers, including the so-called software blue-collar workers (ruanjian lanling) who do both manual and informational tasks at the lower-middle levels of the new industrial system.

Gray-collar workers are graphic designers, database operators, technicians, software testers, and others who engage in repetitive work procedures in the production process. The job often requires working with computers and some aspect of data entry and processing. The work procedure relies on the worker's hands as well as his or her mind. The SMS authors (duanxun xieshou) employed by China's ICPs belong to this category (Lan 2005). So do the online-game "gold farmers," organized as guilds or workshops to collect virtual property, to be sold for real-world currency to gamers in the United States, Japan, and Taiwan (H. He 2005). Since 2005, the business of gold farming has moved from coastal South China to inland provinces, where lower labor costs allow larger-scale operation and a higher profit margin.[12] In Wuhan, central China, there were more than two thousand so-called black gaming workshops in 2007 (Han and Yang 2007).

The supply of gray-collar workers lags far behind the demand of the growing ICT industry, which adds to the prominence of this new category of labor (L. Wang, Xu, and Huang 2004; D. Wang and Yang 2004). MII statistics showed that in 2005, China had about 100,000 software blue-collar workers, but the demand in the software industry was 460,000 (MII Personnel Bureau 2006). Shanghai, for example, needed 13,800 gray-collar workers in 2002, but the supply was only 3,800. The municipal government has therefore endeavored to train gray-collar workers in the city and attract them from elsewhere (L. Wang, Xu, and Huang 2004), thus expanding this lower-middle layer of workers in between the white- and blue-collar strata.

The income and status of gray-collar workers in China's new content business, such as SMS production and virtual property trading, vary greatly depending on the person's qualifications, skill level, and the overall market demand at the time of hiring. Yet these are similar structures of flexible and networked labor reorganization through which a new layer of informational workers, programmable labor, is added between generic and self-programmable labor.

The creation of programmable labor at the lower strata of the informational work process is more than an increase of gray-collar workers and the addition of another new layer in the production hierarchy. It is about complex cross-strata collaboration. As Zeng and Williamson (2007) argue, Chinese firms can outcompete companies in the global market not just because China has cheap labor, but because they can fundamentally restructure the production process based on the reality of Chinese labor

and, in so doing, make a huge variety of products in an unprecedentedly cost-effective manner to meet rapidly changing market demands.

The best example of programmable labor working closely with self-programmable as well as generic labor is BYD, a battery manufacturer in Shenzhen, which by one account had about half of the world's market share for wireless phone batteries (Fishman 2005). Zeng and Williamson (2007) examined BYD's production model and found it has outcompeted Japanese firms like Sanyo and Toshiba, which dominated this market almost exclusively in 1995. But in the short span of a few years, the global market shares of BYD batteries skyrocketed to 75 percent in cordless phones and 28 percent in mobile phones.

The key to BYD's success is an innovative system of "process flexibility" that uses constantly trained and programmed migrant workers in the production process to replace standard machinery, which is expensive to purchase, maintain, and adjust to meet changing market needs (Zeng and Williamson 2007). A typical production line at BYD has a daily output of 100,000 nickel-cadmium (NiCad) batteries (a low-end battery for cordless phone):

It required about 2,000 workers, compared with just 200 needed to run a Japanese line with the same capacity. But the BYD line could be up and running for just 6 percent of the $100 million Japanese competitors would have to invest. One investment bank estimated that this meant financing and depreciation costs were slashed from 40 percent of total costs at Sanyo to 3 percent at BYD. Even with the extra labor required, BYD could produce a NiCad battery for a total cost of $1, compared with costs of $5 to $6 incurred by rivals in Japan. (Zeng and Williamson 2007, 74)

The BYD production model is impossible to use in industrialized economies like Japan due to its high labor costs. It is also impossible in other developing countries with a dearth of starting-level engineers and technicians, especially low-rank self-programmable and programmable labor involved in the manufacturing process. In this way, the BYD model is labor intensive not only in the conventional sense of blue-collar labor being deployed in manual work but in the constant training of assembly line workers, mixing them up with R&D personnel, and the adjustment of key equipment by skilled and semiskilled laborers collaborating with each other. Consequently, BYD can "switch to making a new product within weeks, compared with the three months required to retool a competitor's automated line," which "made BYD very attractive to the mobile industry, who are constantly under pressure to introduce new product ranges into the market quickly" (Zeng and Williamson 2007, 75–76).

The extraordinarily low cost of flexibility in this new Chinese model of labor reorganization refers only to the economic cost for the company and its corporate clients in the wireless phone industry. It does not reflect the full human cost incurred on the part of the low-end self-programmable labor, programmable labor, and generic labor being used as substitutes for computers and machinery. Describing the production process at Chint, which makes transformers and power supply units, Zeng and Williamson write, "These manual lines didn't even have a conveyor belt; when they finished a subassembly stage, the young workers simply snapped on a rubber band to hold it together, then someone else picked it up and delivered it to the next step in the production line" (2007, 77).

What is going on here is a twenty-first-century rendering in the electronics industry of Frederick Taylor's scientific management system that used "simplified unskilled jobs" to power the booming American auto industry in the early 1900s (Zinn 2001, 324). The persistence of simplified unskilled jobs in Chinese informationalism is not to deny the more innovative development of simplified skilled jobs or programmable labor as in the case of BYD's process flexibility. However, the underlying principles of labor management remain the same with respect to the division of labor among the hierarchical strata of employees and the treatment of bottom-level workers as standard parts, be they screwdrivers, conveyor belts, or computer chips, all attached to the assembly line.

This model of flexible yet labor-intensive production creates jobs for have-less migrants, but it also subjects them to dangerous working conditions, resulting in serious injuries. As discussed earlier, forty thousand fingers are lost each year in the Pearl River Delta, many in the process of making desktop computer cases. The problematic labor process is also responsible for occupational diseases like the chronic illness developed among workers in battery factories, for example, in the GP Battery International Ltd. (China Labor Watch 2007).

As in all other social groups, internal stratification among migrants reflects variations in education and gender. The class status of have-less migrants is also influenced by their geographical origins, especially if they are from the countryside. A migrant from rural Anhui and another from the rust belt in Liaoning may have a similar ability to work at the counter of an Internet café, but the former is likely to face more discrimination. Because of her accent and the way she dresses, people can tell whether she is of rural or urban origin, which will then influence the way she is treated as an employee.

While rural-to-urban migrants do not identify easily with interurban migrants, the gap is even deeper between them and the urban underclass of the host cities. In some places, this is due to the tension artificially created by local states, which frequently fire large numbers of migrant workers in order to create jobs for those who are newly laid off in the city (S. Zhao 2004). In other cases, underemployed urban youth from the local communities as well as others from nearby regions constitute a large portion of the urban control system, including not only the police but also a variety of security guard forces who often abuse and exploit have-less migrants, hence worsening the tension and conflict between locals and nonlocals (S. Zhao 2004, 2005a).

At the very bottom of the social structure of have-less migrants are the millions who seek livelihoods outside the formal and legal economic system. This includes the informal economy, which encompasses an army of unregulated laborers, as well as unemployed individuals and organized criminals. Counterfeit goods and products create their own production, transportation, wholesale, and retail jobs, usually involving poor migrants at each step (Booth 2000). Gangs and criminal groups often include rural-to-urban migrants and laid-off workers, not because they are by nature deviants but because society has failed to absorb them.

The criminal offenses are internally structured in a way that defies the typical stigma imposed on migrant workers. The overwhelming majority of crimes committed by rural-to-urban migrants have to do with property (theft and robbery), whereas more serious nonproperty crimes like fraud, drug dealing, and the trafficking of women and children tend to be committed more by interurban migrants and local residents (S. Zhao 2004, 357).

Even within this lowest stratum of have-less migrants, the spread of working-class ICTs is remarkable, as evidenced by the huge market of used handsets, many of which have been stolen and then pawned in exchange for food and shelter.[13] Meanwhile, any casual observation of downtown Guangzhou or the back streets of Shanghai cannot miss the many mobile phone numbers that are written, painted, or sprayed on pavements, walls, light poles, and phone booths. Most of these are for the sale of fake documents, especially personal identification cards, while others are for private detectives and professional debt recovery (by force and coercion). Each of these many phone numbers represents a have-less individual or a group of them who do not have a stable job but can afford a mobile phone.

As Castells and Portes point out, "The informal economy simultaneously encompasses flexibility and exploitation, productivity and abuse,

aggressive entrepreneurs and defenseless workers, libertarianism and greediness" (1989, 11). It is thus not surprising that the Internet and mobile phones are already adopted to coordinate activities in both the informal economy and criminal networks. One such trade is the once prevailing blood business in Beijing, where the recruiters, known as blood heads (xuetou), use online advertisements to attract needy migrants who can access the Internet, most likely through cybercafés. The migrants then sold their blood for a small fee to blood heads, who made a profit by trading the blood at a higher price. In so doing, the migrants could be subjected to HIV infection, and there was a high risk of contamination of the blood products (L. Hu 2005). This underground trade continues and remains a major threat to public health, especially in central and northern China, despite repeated efforts to stop it at the policy level.

Gender

If we take internal stratification as a vertical system that goes from white collar to gray collar, from programmable labor to blue-collar generic labor to street-corner societies, then gender works on a less hierarchical and more relational dimension. Socioeconomic stratification is fundamental but not something that explains all variation within the have-less population. Gender relationship is ubiquitous and by no means a secondary factor in deciding migration patterns, migrant experiences, and the ways female and male migrants use working-class ICTs.

In traditional Chinese society, women were a dominated group. The CCP attempted to smash the Confucian family order in its early years, but Communist rule under Mao in fact reinforced patriarchal values, especially in rural areas (Stacey 1983, Johnson 1983, M. Yang 1999). A peculiar consequence of the Chinese revolution was reflected in the employment of Chinese women. According to data from United Nations Development Program (UNDP), China was among the world's top countries in terms of its female employment rate. However, compared to their male counterparts, the wages of Chinese women who were not in agricultural work were among the lowest in the world (Borja and Castells 1997).

With the acceleration of economic growth, gender relationship in China has become even more complicated with the increase of social mobility among the female population. What we see today among have-less migrant females is no longer submission to their fathers, husbands, and male supervisors. Overall, females have gained new autonomy while also facing new dangers of suppression. This complex process is both reflected and reinforced by the recent adoption of ICTs among have-less migrant women.

Despite the huge amount of Chinese-language research on migrant workers and despite the vibrancy of the new feminist movement in Chinese cities, mainstream migration scholarship inside China has been wearing blinders on gender issues with only a few exceptions (Bu 2007). Many of these are well-established researchers who are keenly sensitive to social inequality in class and stratification. Yet they often implicitly assume that a prototypical migrant is a man, so therefore female migrants do not deserve separate attention. This attitude is also common among high-rank Internet policymakers in Beijing.[14]

In sharp contrast, among English-language publications, gender issues are central to mainstream scholarship on Chinese migrants. Besides volumes by C. K. Lee (1998) and Pun (2005) on working sisters (dagongmei) in the factories of Guangdong (not coincidentally, electronics factories in both cases), other studies, such as Zhang's, have emphasized gender problems within the families of microentrepreneurs in Beijing (L. Zhang 2001). There is also an edited volume by Gaetano and Jacka (2004) devoted to women from rural areas, who take up urban jobs ranging from bar hostesses to nannies.

Female have-less migrants have distinctive migration patterns independent of the movement of male migrants, as shown by three in-depth analyses of data from the 1990 census (Fan 1999, Y. Huang 2001, Liang and Chen 2004). According to Fan, although both males and females migrate to seek industrial and service jobs in China's coastal regions, on a national scale a much larger portion of females migrate to live with their husbands. Within Guangdong Province, the most favored destination of migration, females tend to be overwhelmingly concentrated in the more industrialized part of the Pearl River Delta, whereas the spatial distribution of male migrants is much more spread out in the province (Fan 1999). This is consistent with my observation that while most females live in large factory dormitories in the manufacturing zones, more males work on transportation and construction projects that require higher intraprovincial mobility. Besides this difference, Fan also maintained that when moving across provincial boundaries, females tend to travel longer distances than males. From another study, we learned that some of these have-less women emigrated to New York City and found work in the garment industry there (Bao 2001).

Given these findings, it is not surprising that females use working-class ICTs differently from males. In the general population, the gender gap in Internet access has been narrowing, with the male-female ratio declining

from 7.13 to 1 in October 1997 to 1.34 to 1 in January 2008 (CNNIC 1997, 2008). Gender inequality, however, remains significant, especially among the have-less population. Visits to cybercafés in working-class communities almost always mean more encounters with males rather than females (Qiu and Zhou 2005). My female focus group participants in Sichuan and Guangdong explained that they wanted to save money, and a number of them do not know how to surf the Web. Even among those who visit Internet cafés, whereas males tend to play online games, females like to chat through QQ or spend time in chatrooms. Research findings from several studies also suggest that SMS and mobile communication have started to assume an important role in shaping the identities of female working sisters in both Guangdong (A. Lin 2005, Ma and Cheng 2005) and Beijing (Oreglia 2007).

Have-less female migrants tend to find jobs mostly in manufacturing (for example, as assembly line workers) and services (waitresses and nannies, for example) rather than male-dominated occupations like construction worker, taxi driver, and security guard. Searching for jobs often involves "gendered sorting," by which the spectrum of jobs available to females is narrowed for both gender groups, but especially for women (C. Fan 2004). Those who can settle in the city with a residence permit (hukou) have a good chance of finding a low-level professional job (for example, as an accountant) or joining the expanding ranks of gray-collar workers in the ICT industry. But the majority of migrants from rural areas still find it difficult to rise above the status of manual laborer. Hence, overall, the average occupational attainment of female migrants remains significantly lower than that of males, as evidenced by official statistics about migrants in Shenzhen (Liang and Chen 2004).

Women also play an irreplaceable role in the burgeoning ICT industry by supplying manual labor on assembly lines of electronics under stringent factory floor management.[15] For ICPs, they are the majority of low-rank service and content providers working in call centers in Beijing and Shanghai to serve, for instance, domestic customers of online travel Web sites. There is a wide spectrum of similar informational gray-collar jobs now occupied primarily by have-less migrant women.

Structural inequality conditions a special mode of gendered industrialization by which a large number of females are entering low-income jobs while becoming part of the myth of docile Chinese women, a critical cultural factor that attracts investors to China's coastal regions (Cartier 2001). The new export-oriented manufacturing industries rely on gendered ways of social control. The entire industrial system, insofar as the rapidly growing

coastal regions are concerned, is patriarchal, from the larger urban institutions to the workplace, now reshaped to control the work and life of female migrant workers using the newly available wireless technologies, as chapter 6 will discuss in detail (Qiu 2007b).

But it is erroneous to deny the liberalizing effects of social mobility on women who back home were controlled by their fathers and husbands. Despite the terrible work conditions they face at their migration destination, being in a factory offers young women escape from the traditional family hierarchy, at least for a few years. They can control their lives with some economic freedom and, above all, choose their own male partner. These are ways by which migration helps empower females within the family structure, which in part explains why females accept their exploitation.

Gendered industrialization takes place in two additional ways. One way relies on the feminization of the agricultural labor force, which releases more male than female surplus labor from agricultural work (Cartier 2001). The other is a key link in the emerging services sector consisting of massage girls, bar hostesses, and commercial sex workers. This is, of course, not just a new "service sector" in an economic sense by catering to the physical and emotional desires of domestic and transnational businessmen and working-class men as well. It also provides a crucial social context for the industrialists to entertain and develop ties with local officials.[16] Hence, without migrant women offering intimacy services, this "ultimate form of male bias in the development process" (Cartier 2001, 201), many deals would not have succeeded as parts of China's industrialization miracle today, a phenomenon systematically discussed by Xin Liu (2002a).

A recent emerging business is telemarketing call centers in selected coastal cities. A large number of female migrants in Zhuhai, for example, have been trained—again, as programmable labor—to speak Mandarin with a Taiwanese accent so that they can place telemarketing calls to Taiwan each day.[17] Similar call centers have also mushroomed in the former Manchurian region of northeast China in cities like Dalian, where have-less migrant women are recruited and trained to place long-distance calls to or answer calls from Japanese customers (Young 2005).

"Telephone service lady" is in fact an old occupation in China's telecom industry. Up to the 1980s, most phone calls in China needed to go through human operators, typically working-class urban women at the time. With the rapid adoption of automatic program-controlled switches, these phone operators were among the first to be laid off from the state sector. In their

place during the 1990s was a new army of pager operators who were behind the market of nearly 50 million customers by the end of 2000. Unlike the phone ladies, these are overwhelmingly female migrant workers hired by private employers. They no longer have the health care and other benefits provided to the earlier phone operators. Since 2000, their jobs have silently evaporated with the pager business.

In the beginning years of the new century, the profession of phone service ladies continued to buttress new ventures in e-commerce, offering everything from customer service to telemarketing messages. But their public image worsened around 2002 with high-profile campaigns against the so-called audio-information station (shengxuntai), the Chinese euphemism for phone sex. These are high-cost telephone content services offered by business partners of local phone companies to a predominantly male market. Women employees in this case, known as voice information station mistresses (shengxuntai xiaojie), are migrants from the countryside as well as laid-off urban residents, including former schoolteachers and pager operators (Xinhua News Agency 2002, Modern Life Daily 2002).

The official crackdown on phone sex was triggered, quite similar to the cybercafé campaigns, by sensational mass media coverage on how youth were being corrupted by phone sex services. This was yet another moral panic created by the commercial media, which reflected little on its own sensational and gendered way of newsmaking. The sentence was squarely laid on the dubious ethics of the powerless voice information station mistresses rather than their male employers or male customers. No one was asking the right questions: Why were so many females unemployed? What are the alternative job opportunities available to them under these male-dominated urban institutions that have expanded through working-class ICTs?

Ethnicity and Regional Identity

The view that socioeconomic stratification explains everything about working-class ICTs can be also put to rest by considering the ethnicity and regional identity among have-less migrants. While the Chinese population is predominantly of the Han ethnicity, there are fifty-five minority nationalities that receive official recognition. These include more famous ethnic groups like the Tibetans, Mongolians, Uyghurs, and Manchurians, as well as lesser-known ones such as the Yis, Tujias, and Drungs. Although geographically most minority nationalities tend to concentrate beyond city limits in their more traditional forms of nomadic, farming, and fishing communities, their lives are nonetheless affected by China's urbanization

and industrialization. Increasingly, ethnic minority groups are migrating to major metropolitan centers such as Beijing (Iredale, Bilik, and Su 2001; Iredale, Bilik, and Guo 2003), while the number of Han settlers soars in traditionally minority areas (Hansen 2005). The two interwoven processes produce new dynamics of interaction among the ethnicities.

Within have-less migrants of the majority Han nationality, region-based differentiation also plays a significant role in their everyday opportunities in ways similar to the functioning of ethnicity. Regional identifications like northerner (*beifangren*), southerner (*nanfangren*), and Shanghainese (*Shanghairen*) are so commonly used that they serve as quasi-ethnic social categories. These regional labels, like ethnic labels, sort migrants into groups and subgroups according to the way they look and speak and their cultural habits, which in turn determine their patterns of migration, occupational development, and communication and the distribution of life chances.

Since the beginning of economic reform, the proportion of China's minority population has been rising. According to official census data, this percentage increased from 6.7 of the total population in 1982 to 8.41 in 2000. This is a result of intermarriage and preferential state policies such as looser implementation of the one-child policy in minority communities. Meanwhile, the minority population has also been assimilated into the mainstream Han society.

Still, many ethnic groups are left out of the general modernization process. These are people in remote areas with crumbling public infrastructure and living in desperate poverty. Those who remain in these areas are strictly have-nots because their villages lack reliable electricity and water supply. Even if some of the richer families have a TV or radio, many of them do not understand the official Mandarin language because their village schools have had no teachers to teach them Mandarin since the end of the Maoist era.

Their deteriorating living conditions explain why, in recent years, more ethnic-minority migrants have appeared in the streets of large cities creating, for example, notable ethnic enclaves in urban areas (Iredale, Bilik, and Su 2001). From Beijing to Chengdu, more Mongolian restaurants are now served by migrants from Inner Mongolia. Muslim noodle shops are appearing in Guangzhou and Tianjin, and Tibetans now sell herbs and silverware in the streets of Shenzhen and Shanghai.

Although researchers have turned their attention to the migration experience of various minority groups (Iredale, Bilik, and Guo 2003), overall there is little research on social networking among China's ethnic-minority

migrants, in part because ethnic tension and discrimination remain politically taboo. But these people, like have-less migrants of Han ethnicity, have also started to use prepaid mobile phone services and other working-class ICTs for migration decision making and coordination. Among ethnic minorities in southwest China, the mobile phone has become a common communication tool, especially for village seniors and local businessmen, who used it to organize cultural and religious activities.[18] Buddhist monks are reported to have been the first group to adopt mobile phones in Tibet (Roudanjia 2007).

The obstacle facing many of the migrant ethnic groups is deep suspicion from the urban Han population. Muslim migrants from northwest China, for example, are often discriminated against in Beijing due to their skin color and accent and are equated with criminals (Iredale, Bilik, and Su 2001). Yi nationality cadres in Sichuan also complained about incidents of ethnic hatred against poor members of their ethnic group that have occurred in the cities of Xichang and Chengdu.[19] As a result, an enclave economy became the typical solution: ethnic migrants either specialize in certain service sectors like ethnic restaurants or they become absorbed by the informal and criminal economies because of the lack of decent employment opportunities. Semilegal and illegal associations perform more than simple economic functions. To marginalized people, they may also provide social support, a sense of belonging and trust, and a taste of power and respect, although in the final analysis, these may turn out to be illusions and disguise more profound in-group exploitation.

Regionalism within the Han majority group works in ways comparable to the ethnicity-based processes of social sorting. As documented by the classic work of Honig (1992) regarding Subei people in prereform Shanghai, the local origins of migrant populations within the Han ethnicity function as a powerful basis for urban prejudice and discrimination. The most basic distinction here is the north/south division, which is relatively easy to tell based on physical characteristics like height, face shape, and, above all, dialect and accent.

Regional stereotypes result from long historic lines of representation that continue to govern daily life in Chinese cities (Cartier 2001). Like Shanghai residents who used to despise those from Subei, it is common in the industrial zones of Guangdong for northerners to be seen as rude and unsophisticated. In particular, the derogatory name "northern sisters (*beimei*)" is used to designate uneducated female laborers in low-pay manufacturing jobs or sex-related service sectors.

In Beijing, region-based discrimination more often targets selected migrant origins, especially people from Henan. A common myth is that all Henan migrants cheat. Thus, a number of computer companies in the Zhongguancun area, Beijing's IT hub, once posted signs on their entrances saying "Henan people and dogs are not admitted" (S. Ma 2002). Similar discrimination happened in Shenzhen in 2005 when a local police bureau put up a banner against "Scam Gangs from Henan" (XinhuaNet 2005).

Both incidents spurred widespread criticism and debate among Chinese netizens, although there is no sign that region-based discrimination will be put to an end anytime soon. Migrant workers from Henan continue to be singled out as not suited for urban employment and Henan entrepreneurs are considered untrustworthy for business partnership. The consequences of this bias are quite similar to the discrimination against minority ethnicities, like Muslim migrants from Xinjiang, or the unequal treatment of migrant women, all feeding into the spiral of prejudice and constraining the life chances of have-less migrants.

On March 14, 2008, a devastating outburst of ethnic tension raged through Lhasa. Five female shop attendants, four Han and one Tibetan, were trapped in their store and burned to death. All were migrant workers around twenty years old, who had come from Henan, Sichuan, and elsewhere in Tibet. Minutes before they died, they sent SMSs to their families in Lhasa and in their home villages (Barboza 2008b, 6): "Don't go outside. We are hiding in the store," texted Cirenzhuoga, the Tibetan victim. Liu and Chen, two of the Han victims, texted: "Mom, don't go outside. Be careful. Some are killing people." "I am safe at the store." These final words sent from the burning store shall be remembered as some of the most emblematic texts for the persisting problems of class, gender, and ethnicity, for the internal stratification and confrontation among have-less migrants, now inscribed in history through low-end wireless phone.

Translocal Networking beyond Boundaries

A translocal network is a flexible structure that spans two or more places. It consists of localities like villages or factories or businesses by migrants. It includes, more crucially, all forms of connectedness among the localities, like those through working-class ICTs. Altogether the people, their relationships, and the tangible and intangible flows of goods, services, information, and emotions constitute an expansive space of mobility and meaning. The migration streams, following family, kinship and kin-like connections, are not floating blindly, but are purposively to selective places

is expanded while the core logic of social bonding, like that surrounding migrant families, is strengthened (Cartier, Castells, and Qiu 2005).

As Eric Ma critiques, too often researchers of contemporary culture focus on transborder "global/local flows" at the expense of better understanding of "local/local dynamics" (2002, 132). The problem is more serious in China ICT studies, which have almost completely ignored issues of translocal connectivity, as shown by researchers' focus on global and national issues (Qiu and Chan 2003). But it is precisely the networks of connectivity that have immediate effects on opportunities for the information have-less. It is also an oversimplification to see have-less migrants as merely individual consumers of ICT services. For them, much more so than the elite, working-class ICTs serve collective purposes of decision making and coordination—above and beyond individualistic pursuit for personal goals—in the process of migration.

Translocal networking is nothing new in Chinese history. Networks of family, kin, and friends have been always critical to migrant experiences, as can be learned from migration studies worldwide. Traditional Chinese society particularly emphasizes the Confucian family order in its translocality. The era of Mao also created its own translocal networks, for instance, among cadres, soldiers, and the sent-down youth (the generation of teenagers sent from urban to rural areas during the Cultural Revolution). Hence, as Oakes and Schein maintain, "While the current translocal boom might appear to be an artifact of the marketization and liberalization of Chinese society, a straightforward causal relation between the two is belied by the occurrences of translocality earlier in Chinese history" (2006, 2).

In the post-Mao era, translocal networks have played a central role in directing the flow of migration from the countryside and the rust belts to the urban, urbanizing, and industrializing areas. A survey of 818 migrant workers at the Beijing Railway Station found that 76.8 percent of them found their first job in the city through family members, relatives, friends, or fellow migrants from their places of origin. Half of the employed migrants relied on such networks of acquaintances for their current job (S. Zhao 2004).

A probability sampling survey done in Jinan, Shangdong Province, in 1995 included 1,504 migrants registered with the local police bureau.[20] Overall, 81 percent of them depended on translocal networks in their decision making in rural-to-urban migration through such ties as relatives, friends, and same-origin migrants (tongxiang). For interprovincial migrants, the ratio is 88.3 percent, significantly higher than intraprovincial migrants. In contrast, news media were seen as helpful by only 2.7 percent of

failure of traditional media to meet the informational needs of have-less migrants is a basic reason for the continued centrality of translocal networking, which explains the surging popularity of working-class ICTs in recent years.

Indeed, some telcos have been more locally oriented, as shown by the development trajectory of Little Smart. This is also the case for domestic-brand handset producers like Bird, which used rural counties and market towns as its main launching pad. Most important, landline phones have made significant inroads in the countryside, thus enabling more have-less migrants to call home. The ratio of villages equipped with landline phones was 45 percent in 1985, 75 percent in 1999, and 85 percent in 2003 (Harwit 2004). By the end of 2007, telephone access was available in 99.5 percent of villages in China (MII, 2007).

Since 2004, impressive growth has been observed in the rural areas of West China. While single-digit growth rates were recorded for urban land-lines and landlines in East China, it was 16.4 percent and 15.6 percent for the countryside of West China in 2005 and 2006, respectively.[21] Improved connectivity in ethnically diverse western regions means that minority ethnicity migrants now also have a stronger motivation to adopt working-class ICTs such as low-end mobile phones and prepaid services in order to place voice calls to their families back home.

There is a wide variety of migration trajectories. Have-less migrants, some with their families, others by themselves, may go from city to city for an extended period of time. Or they may go home regularly and become seasonal workers. The journey may end up in the provincial capital, a factory zone in coastal China, or overseas destinations, as in January 2007, when five migrant workers from Sichuan Province were abducted while working on a rural telephone project in southern Nigeria (Xinhua News Agency 2007).

Along the migration journey, numerous have-less ICT entrepreneurs and telecom service providers have established cybercafés and newsstands that sell prepaid cards. These businesses usually do not have access to bank loans or state subsidies, which means that microentrepreneurs have to rely on family savings and, quite frequently, funds borrowed through translocal networks, for example, among fellow villagers. If the business succeeds, the investments strengthen migrant networks translocally.

This was how Zhang, a Shenzhen cybercafé operator, brought his entire extended family from the northern rust belt zone of Benxi, Liaoning Province. After being laid off in 1998, Zhang used informal borrowing to start

his cybercafé in a neighborhood of blue-collar and gray-collar service industry workers. As his business steadily grew, his brother joined him, followed by his parents and cousins. Some of them helped at the cybercafé, and others started their own business nearby, following a typical pattern of migrant entrepreneurship.[22]

Translocal networks thus perform multiple functions in directing migration flow, providing social support, and sustaining identity formation among newcomers in the city. A widely expected result is upward social mobility, by which migrants gain new skills, higher income, and more prestige. This is the case for migrants from poor inland provinces, who are found in large numbers working in coastal industrial zones. Most of them could earn little cash back home. But taking jobs in big cities allows them to be financially independent and able to send home billions of yuan that can exceed the total fiscal income of the local governments at migrant origins (table 4.8).

What can be observed here is but one result of massive migration and translocal networking: the flow of wealth that should be among the most effective ways to alleviate poverty. These are much more than strictly monetary resources in the economic sense because they also bring dignity to migrants and their families, a real uplifting with tremendous social value. Because these flows could not have been coordinated without long-distance communication, they powerfully testify to the relationship between migration and translocal networking, which was well under way in 1999.

After the wide spread of working-class ICTs, translocal dynamics have intensified, taken on new modalities of communication, and led to new

Table 4.8
Local fiscal income and remittances from migrant workers in five provincial-level administrative units, 1999

Province or municipality	Fiscal income (billion yuan)	Total remittance from migrant workers (billion yuan)
Anhui	17.4	21.7
Chongqing	7.7	12.0
Sichuan	21.2	21.0
Hunan	16.7	15.9
Jiangxi	10.5	9.9

Source: Compilation based on Cui (2004a). Data collected by Research Center for Rural Economy, PRC Ministry of Agriculture.

empowerment effects and cultural expressions on the basis of networked connectivity. One example is the temporary labor shortage since 2004 in many Guangdong factories, where managers found it increasingly difficult to hire employees, especially low-wage ordinary workers (*pugong*), an unprecedented problem of migrant dearth (*mingonghuang*) (Chua 2005, S. Yang 2006). The underlying reasons were stagnant wages, poor benefits, and rising living costs in the southern region, which made Shanghai and the nearby Yangtze River Delta more attractive to have-less migrants than Guangdong. But how could migrant workers learn about employment information in other places?

Migrant worker networking often started with face-to-face communication during the Lunar New Year festival, when have-less migrants went home and exchanged job information using working-class ICTs and made their collective decisions from there. The common use of SMS to coordinate collective reposition has been recorded in the industrial zones of Dongguan, Guangdong (Law 2006). The network effect of migrant dearth then takes place quickly because have-less migrants are informally organized according to their home origins. The translocal ties can therefore empower them in their bargaining with employers. Despite the absence of labor unions, network labor can nonetheless gather and exchange job information through SMS or long-distance phone bars and then vote with their feet.

Have-less migrants have begun to use blogs to foster horizontal communication among themselves (see the Internet Resources at the end of the book). One of them is Han Ying, who left home in rural Sichuan at age sixteen and lived in Chengdu, a large city, where she worked for five years as a waitress and hairdresser. She began blogging in November 2006. By March 2008, her blog has attracted a million visits.

Han Ying's blog chronicles her life as a migrant worker. She had many jobs—street cleaner, construction worker, security guard, foot massage girl, factory worker, and others—including some she took just for the experience so that she could blog about it. Her writing is usually brief but reveals her personal emotions: homesickness, childhood memories, and aspirations for the future. It contains more than a thousand photographs showing her daily activities, such as the one in figure 4.1, which was taken when she bought goods for her new online clothing store at Taobao.com, a popular low-end e-commerce Web site. Images like this attract new friends, especially other have-less migrant bloggers. By March 2008, Han Ying has 2,269 blogger friends whose blogs were cross-linked with hers.

Figure 4.1
A blog by Han Ying, a migrant woman from Sichuan. *Source:* http://hybh3399 .blog.163.com (accessed March 29, 2008).

Sun Heng is a migrant from Henan who used to work as a porter and salesperson in Beijing. On May Day 2002, he founded the New Labor Art Troupe and began to provide nonprofit musical performances and services for other migrants. Initially the group was not well known. But in 2004, the troupe produced its first CD, *All Workers Are Family* (*Tianxia dagong shi yijia*), which was uploaded to their Web site for free trial listening (www.dashengchang.org.cn). In 2007, they produced their second CD, *Singing for the Labor!* (*Wei laodongzhe gechang!*) including a song written by Sun Heng entitled "Coal" that describes translocal ties among have-less migrants:

Coal

When it's cold outside
A man from my village
Brings me a cart of coal
That blackened face grinning wide
Warmed my heart and soul

Snow is floating in the sky
Those two black hands
Are his pride
The hands bring his grain, his child's toys, his wife's clothes,
And the whole family's happiness.

I have wondered more than once
How to pass these long cold nights
But now I finally understand
What real light and warmth is.

By the end of 2007, the New Labor Art Troupe had performed in more than a hundred concerts in eighteen cities all over China, including Hong Kong. Everywhere they went, they tried to mobilize performance art resources in the local migrant worker communities, using e-mail and mobile phones. They held training sessions for labor activists and sang their songs—always straightforward and down-to-earth like "Coal"—together with their working-class audiences. They also adopted Creative Commons–Mainland China, using the Attribution-Noncommercial-No Derivative license to distribute their content online and via CD albums.[23]

Han Ying's blog and the New Labor Art Troupe reflect increasing efforts at the grassroots level to use working-class ICTs for cultural expression and networking. A similar development is *Migrant Poets* (*Dagong shiren*), a magazine based in Guangzhou now using the Internet actively, for example, by calling for poetry submissions by migrant workers nationwide.[24] As Zhan (2006) discovered, writing poetry has become increasingly common among migrant workers, especially domestic helpers who work and live in solitude in upper-class families. *Migrant Poets* provides a platform for these literary expressions on the Net and in print.

Despite these bottom-up cultural formations of network labor, there is a limit to what they can publish under China's censorship regime. They can talk about the forty thousand fingers lost each year in the Pearl River Delta, but they cannot write about collective actions and labor-capital confrontations within mainland China. Otherwise their blogs and Web sites will be closed down or sanitized.

As a result, discussions about industrial actions outside mainland China and international labor movements become popular. For example, during the iron workers' strike in Hong Kong in 2007, poems by working-class strikers in Hong Kong were widely circulated and discussed in online forums of migrant poets within the mainland. This is polemic poetry that criticizes the unequal distribution of wealth and power in Hong Kong's capitalist system, dominated by the corporate elite. In this case, the

transcendence of social boundaries is not a reflection of increased physical mobility among have-less migrants. Rather, it is a strategic way for independent cultural expression at the grassroots of the Chinese informational city.

The Mobility Multiplier of the New Century

While examining media and modernization in the Middle East during the 1950s, Lerner coined the term *mobility multiplier* (1958, 59) because he found the radio and, to a lesser extent, film allowed communication beyond face-to-face interaction, thus fostering understanding across space and time. People's horizons were broadened, and they could imagine how social change might be possible.

In many ways, working-class ICTs can be seen as the twenty-first-century equivalent of mobility multipliers because they facilitate the expansion and acceleration of mobility patterns created by urban growth and industrialization in a global context. Surging mobility leads to more informational needs among migrants that are now met primarily by working-class ICTs. This is a process that changes millions of information have-nots into information have-less, which is inevitable due to the disappointing role of mainstream mass media in serving have-less migrants. The result is increased networked connectivity and more prominent translocal dynamics that feed back into the erosion of traditional economic sectors like agriculture and state-owned enterprises (SOEs) and into population mobility, from rural areas to cities, from small towns to metropolises.

Working-class ICTs also differ from the radio Lerner observed. One may argue that the new digital communication tools are more powerful because they are two-way and interactive. They are more in the hands of the have-less, allowing them to talk directly to each other and share their own user-generated content like image-loaded blogs, which would be impossible in elite-dominated mass media. Working-class ICTs are, in this sense, microsolutions for macroproblems faced by have-less migrants by directing migration flow, disseminating job information, and providing badly needed social support.

But these are not yet the core differences, which should be understood in three more profound ways. First, the decentralized network structure of cybercafés and low-end mobile communication means more complexity in the direction of social change, of which modernization is only one possibility. The diffusion of working-class ICTs into the hands of have-less migrants may empower them by providing more connectivity, but may

also subject them to commercial alienation, gangster activities, and stricter means of control at work or at home. The smaller scale of the operation, often in personal and small-group settings, means a close match with traditional translocal networks, thus suggesting a process of retraditionalization rather than a one-way journey to modernity.

Second, while physical mobility has increased with the spread of working-class ICTs, it remains disputable whether there is real social mobility at the system level toward more equality across strata and class. This is due to the trend of decentralization and the predominantly translocal ways of networking, based on the fact that have-less migrants are not a single homogeneous group in their composition and ways of adopting and appropriating ICTs. Migration does create openings for upward social mobility. But translocal networks cannot by themselves erase existing inequality and prejudice. Instead, the translocally networked nature of migration and communication means that the life chances for different migrant groups are still structured in drastically dissimilar ways. Some may be marginalized more than others. Some, due to their gender, ethnicity, or regional identity, tend to be locked into particular enclaves of migrant businesses. Still others are more likely to be absorbed into informal economies in order to survive.

Third and perhaps most fundamental, the rise of working-class ICTs is a harbinger of new class dynamics, whose centerpiece is the emergence of network labor in not only occupational but also cultural and political terms. Essential to China's urbanization and its ascendance as a global industrial power is its burgeoning electronics manufacture and IT services provision sector, whose structural transformation toward cost innovation would have been impossible without a systematic reorganization of Chinese migrant labor. This process reflects the peculiar historical juxtaposition of industrialization and informatization in the Chinese context. It produces gray-collar software testers, SMS authors, and call center ladies, all in the expanding category of programmable labor. They collaborate with low-rank self-programmable labor and generic labor, as not only in the case of BYD but also the networks of migrant-worker bloggers and Internet poets, who use working-class ICTs to organize themselves in flexible networked ways horizontally and from the bottom up to resist the top-down challenges of network enterprise. This emerging network labor, still in a formative stage, is a defining feature of Chinese informationalism in the new century.

5 Young and Old

The information have-less are not only people on the move but also those with lower mobility. In contemporary China, immobility may result from a lack of financial and social resources. Or it may reflect the inertia of old lifestyles, which is, however, increasingly difficult to sustain given the pressure of China's urbanization and industrialization. In all this, age makes a huge difference by limiting mobility at both ends of the age spectrum. The young and the old need care. Their dependencies—some biological, some social; some enjoyed, some imposed—prevent them from leaving the family, which constitutes a distinct part of their vulnerability in coping with the transformations, using the limited means at their disposal, including working-class ICTs.

Relative immobility creates and intensifies localized informational needs in the family unit, which is now characterized by only children and aging. This is most prominent in China's newly commercialized education and health care systems, which are referred to, along with for-profit housing reform, as the new "three mountains" that weigh down the Chinese people (Gu 2007, D. Yang 2005, 2007).[1] Dealing with surmounting insecurity and the existential issues of life is essential to the shaping and "domestication" (Silverstone and Haddon 1996, Haddon 2003) of ICTs among the main subjects of this chapter: the have-less young and have-less seniors.

This chapter focuses on the young and the old among the information have-less, who are also critical to the formation of the new working class in the Chinese informational city. The core issue at stake is the family—the disparity between families and the inequality within them—which determines the life chances for the young and the old, empowered or disempowered through the deployment of working-class ICTs. The social scope of the have-less needs to be broadened here to include even some upper-class families where the young and the old are disempowered, isolated

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or even abused. This broadening of scope does not dilute our attention on young people and seniors in working families. Instead, it highlights the need to look at more general trends of inequality and ICTs concerning the young and the old, for the information have-less are an integral part of Chinese society. Socioeconomic stratification is but one dimension in the notion of the have-less, whereas power structure, cultural expression, and autonomy in the family are equally important elements in the overall conception.

What are the basic living conditions of have-less young people and have-less seniors? Why do they need working-class ICTs? How do the processes of change, like the one-child policy and education reform, affect the younger generation and thus condition the diffusion of low-end technologies among them? What role do working-class ICTs play for the elderly, who face the challenges posed by health care reform and the lack of social security? Can new services such as SMS and Little Smart create opportunities for equality? To what extent are the new means of communication being usurped in ways that disempower lower-mobility groups, for example, through aggressive promotion of commercial products? What policies can enhance the social services function of working-class ICTs for the young and the old? This chapter tackles these questions.

The Young, the Old, and Working-Class ICTs: An Overview

First, let us briefly examine demographic change regarding these two groups of have-less people and how they are related to working-class ICTs in general terms before looking at the more specific structural conditions that shape the technosocial emergence of the young and the elderly. Because this is an overview designed to provoke questions, I use more inclusive definitions in order to fully capture the internal diversity of these people and their dynamic relationship with the technologies.

By the young, I mean all children, adolescents, and young adults through age twenty-four, which corresponds to the age breakdown of official demographics on the Internet user population (CNNIC, 1999–2008). China had 355.5 million young people between ages six and twenty-four in 2004, accounting for more than a quarter of the national population (table 5.1). If we look only at registered city dwellers, in 2004 there were 77.9 million young people within this age range, representing 24.1 percent of the total urban population (Almanac of China's Population 2005). These statistics encompass wealthy households and dispossessed communities. Overall in urban China, young people from working-class backgrounds account for a

Table 5.1
Population change of the younger generation and the elderly, 1982–2004

	The younger generation, ages 6 to 24		The elderly, ages 60 and over	
	Number (millions)	Percentage of total population	Number (millions)	Percentage of total population
1982	422.8	42.12	76.6	7.63
1990	419.5	37.38	97.0	8.58
2000	396.2	31.88	130.0	10.46
2004	355.5	28.37	154.9	12.36

Sources: Compilation based on Almanac of China's Population (1985, 1993, 2005); Tabulation on the 2000 Population Census of the PRC (2001).

large proportion of this age group, which includes the children of manual laborers, laid-off employees, and migrant workers.

In urban areas, not only colleges but all middle schools and primary schools are also required to offer courses on information technology (xinxi jishu bixiuke) according to Ministry of Education (MoE) guidelines.[2] Hence, students have been a prominent group of Internet users in nationwide surveys. Since 2000, official CNNIC reports show consistently that about a quarter to a third of Chinese netizens are students, and more than half of all netizens are aged twenty-four or younger, almost doubling the percentage of youth in the general population (table 5.2). The percentages were even higher in surveys by CASS during the Spring Festival in five large cities (Beijing, Shanghai, Guangzhou, Chengdu, and Changsha), which found that students accounted for 42.6 percent of all netizens in 2000 and, in 2005, 87.8 percent of young people aged sixteen to twenty-four went online regularly (Guo and Bu 2000, Guo 2005).

School dropouts, including boys but more often girls, also can be have-less young people, which also encompasses diverse types of unemployed youth, child laborers, and juvenile delinquents. These young people at the margins of society may be deprived of formal education. But for a variety of reasons, they are also becoming members of the information have-less and adopting a range of working-class ICTs whose uses often go beyond classroom instruction.

As learned from my fieldwork and research, teachers and parents often complain that young people regard Net bars as more magnetic than schools. In China as in other countries, youth are the leading force in shaping a

Table 5.2
Youngest people and seniors as a percentage of China's Internet user population, 1999–2007

	Students	Below age 18	Ages 18 to 24	Age 24 and under	Over age 60
1999	21.0	2.4	42.8	45.2	0.4
2000	20.9	14.9	41.2	56.1	1.3
2001	24.1	15.3	36.2	51.5	1.1
2002	28.0	17.6	37.3	54.9	0.9
2003	29.2	18.8	34.1	52.9	0.8
2004	32.4	16.4	35.3	53.5	1.1
2005	35.1	16.6	35.1	51.7	0.8
2006	32.3	17.2	35.2	52.4	0.9
2007	28.8	19.1	31.8	50.9	4.2 [a]

Sources: CNNIC (2000–2007), year-end data.
[a] more than 50 years old.

"mobile youth culture" (Castells, Fernandez-Ardevol, Qiu, and Sey 2006), which includes young migrant workers. Like have-less young people raised in urban families, these young migrants, many with only a junior high school education, have become mobile users as a result of the availability of domestic-brand handsets, second-hand markets, SMS, and prepaid services.

In contrast to young people, senior citizens are often latecomers to the diffusion of new media technologies. As in many other societies, the growth of the number of aging people in China has accelerated since the 1990s. In 2004, there were 154.9 million seniors at or above age sixty, making up 12.36 percent of the country's population. But the proportion of older people using the Internet has been flat, at around 1 percent of all Internet users in China, since 2000 (table 5.2).

Overall, when it comes to Internet access, the age gap identified by Harwit and Clark (2001) persists. But given the rapid growth of China's total Internet user population, the absolute number of senior-aged netizens has also increased significantly, from 35,600 in 1999 to 1.23 million in 2006. This means, importantly, that the age gap has not widened and the growth of elderly Internet users has kept pace with that of the general population. So far, most of these senior citizens are urban residents with relatively high socioeconomic status, many of whom nevertheless retain their old lifestyle and consumer habits including, for instance, frugal spending patterns.[3] They go online to search for information, especially

medical information, and to keep in touch with their children in other cities or overseas. With Internet penetration approaching saturation among urban youth, have-less seniors are among the potential groups that will benefit from the next wave of Internet diffusion.

Meanwhile, senior citizens, including those from lower socioeconomic groups, are catching up much faster in the wireless market. According to a 2004 report , 11 percent of Chinese mobile phone consumers were between the ages of fifty-five and sixty-five,[4] which slightly surpasses the share of this age group in the total urban population.[5] Voice telephony over wireless phone is much easier to handle than Web surfing. Handsets are less expensive than desktop computers and more portable than laptops. They are also more likely to receive these as gifts for staying in touch with their adult children or keeping up with their social activities and networks.

From a broad perspective, have-less seniors include pensioners, who are living on a fixed income, as well as those who retired without a pension or were forced into early retirement in layoffs. While young people are affected by the industrialization of education, the elderly face the commercialization of health care. For these reasons, they go online for medical information and stay connected with families and friends through low-end mobile phones, for example, using Little Smart and prepaid services.

At a time of increasing uncertainty, when the safety net is yet to be woven, when sons and daughters are moving to other towns or the other side of the ever-expanding city or even the world, it is understandable that seniors would turn to ICTs to preserve their cherished social bonds. Working-class ICTs are popular among have-less seniors because few of them need the latest multimedia technology or high-end mobile services. What they need is something simple and affordable, which is the case even for those who enjoy a sufficient retirement income and benefits or have wealthy children.

Due to their relative dependence on the family, the young and the old are both affected by the one-child policy, aging, and changes in household structures. When rural-to-urban and interurban mobility rise among the adult population, the fate of the two lower-mobility age groups is often closely tied to each other. Grandparents take care of grandchildren when the parents are away, while the reverse is also true for young people, who provide their company and support to the elderly. According to Duan and Zhou (2006), there are approximately 22.9 million children under age fourteen who are left behind by at least one of their parents. These

left-behind children (*liushou ertong*), mostly left behind by migrant-worker parents to live with grandparents or other relatives for several months of the year) are highly concentrated in six provinces, such as Sichuan, Jiangxi, and Anhui. These six provinces have 55.2 percent of all left-behind children in the country. These children live with other left-behind family members, especially the elderly (Bu 2008).

Among migrants, the rising demand for ICTs is a direct result of their sociospatial movement. Both the young and the old need information and connection to the world surrounding them, which is going through rapid change. Have-less young people and have-less seniors must acquire new means of communication in order to survive, adjust to the environment, and hold on to the things they value. In a transitional society like China today, immobility does not guarantee life stability.

It is under the circumstances of profound structural change that the value of informal networks, sustained by working-class ICTs, should be understood. In this sense, low-end ICTs are also microsolutions for macroproblems for the young and the elderly, just as they are for migrants. Although there are different levels of mobility, the function of working-class ICTs is not different in kind.

When it comes to specific technology, these two groups make notably different choices that set them apart from migrants and from each other. Some working-class ICTs have a strong appeal to groups with lower mobility rather than those on the move—for instance, Little Smart, the limited-mobility wireless technology. Other low-end services like cybercafés are socially constructed almost exclusively for young consumers. SMS is predominantly for youth because of the physical challenge of the interface. Although in theory adequate technical support can make Internet cafés and SMS user friendly to senior citizens, in practice this has not happened, leaving the challenge of the aging society largely unanswered.

When the young and the old begin to use working-class ICTs, they extend existing social ties among family members, friends, and relatives. This reinforces their social networks, communities, and their collective values. But can have-less young people and have-less seniors enjoy more autonomy and forge new connections using these new communication tools? How can they appropriate working-class ICTs for new goals under unforeseen circumstances, which may impinge on the family unit in flux? The lack of mobility may constrain the process of technology deployment, but it may also bring about unexpected applications and liberate the have-less from the immediate environment that can make them vulnerable.

"Little Emperors" and Have-Less Young People

Why do Chinese young people adopt ICTs? At a general level, the reasons are not too different from what we have learned in other countries: they need to get information, socialize, and be entertained. The three Internet applications most popular among Chinese urban youth were online gaming, chatting, and e-mail in 2000; in 2003 they were Web browsing, online gaming, and content downloading (Bu and Guo 2000, Bu and Liu 2003). These seemingly universal ICT functions for the younger generation, however, emerge from specific Chinese conditions. One of the most noteworthy and most distinct factors is China's one-child policy, "the most aggressive, comprehensive population policy in the world" (Short, Zhai, Xu, and Yang 2001, 913), which impinges on all aspects of young urban lives, including their connections with working-class ICTs.

The one-child policy, formally promulgated in 1979, affects everyone, especially the urban population. As a result, the nation's birth rate dramatically dropped from nearly 6 percent in 1969 to 2.7 in 1979 and 1.87 in 2006 (Tien 1991; *China Statistics Yearbook* 2007). The fertility rate is generally lower in cities than in the countryside. Shanghai, for instance, became the first to see death rates exceed birth rates since the 1990s (XinhuaNet 2004a). The family planning policy effectively creates a distinct generation that accounts for the overwhelming majority of urban youth below their mid-twenties.

Known as "little emperors (*xiaohuangdi*)," only children are often spoiled by the older generations, who devote their undivided attention and resources to the upbringing of their youngsters. Empirical research confirms that Chinese parents are now more involved in child care than in the past (Short, Zhai, Xu, and Yang 2001). One important effect of this change in urban areas is the elevated status of girls, who can "enjoy unprecedented parental support because they do not have to compete with brothers for parental investment" (V. L. Fong 2002, 1098).

But more care also means more control and less autonomy. Excessive protection leads to dependent personalities, while it may also trigger rebellion. In most urban families, Chinese parents tend to maintain significant control over their children's Internet behaviors, although not always successfully. As Bu and Liu found in their seven-city survey, 51.3 percent of the parents exerted "some control," 12.9 percent imposed "a lot of control," and another 6.4 percent had so much control that "it is almost impossible to go online when parents are home" (2003, 77).

Parental control is also a prominent issue in wireless communication, as in the case of a Shangdong family in East China, where the father used the mobile phone to maintain surveillance over his teenage daughter. Her wireless phone was a so-called subunit (ziji), meaning that her father could see every SMS she sent or received, as well as the phone number every time she received or placed a wireless call. According to the informant, a class-mate of the daughter, she was very upset with this arrangement but had to live with it until she entered college, when she switched to regular mobile service.[6]

The most obvious consequence of the one-child policy is the elimination of siblings, at least in cities, where the policy is more successfully imple-mented than in the countryside. Care from parents and grandparents, however attentive, cannot replace the company of brothers and sisters. Loneliness therefore has become a major issue, especially at a time when most urban families have moved away from traditional communities based on hutong alleys and danwei (work unit) housing. In the new environment of high-rise buildings, where most neighbors are strangers, children have to conduct more "microcoordination" (Ling 2004) than ever before in order to conduct social activities. With the help of working-class ICTs, have-less young people can reach out to their peers. Their collective activities may be conducted over the Internet, like chatting via QQ, or they may go through SMS. There may also be an offline component, such as the commonly observed pattern of teenage boys collectively patronizing Internet cafés (Qiu and Zhou 2005). For these junior netizens, the time spent together is a precious part of the shared experience, which becomes all the more important for only children precisely because it is not purely online.

What kinds of families do adolescent Internet users come from? Table 5.3 summarizes findings from two surveys conducted by researchers at CASS in 2000 in five large cities and the other in 2003 in seven large cities. It shows that although up to a quarter of China's adolescent netizens come from the families of professionals, managers, and cadres, more of them have parents who are workers, clerks, and sales and service personnel. There are also a notable number of them whose father or mother (or both) are unemployed.

Most important, between 2000 and 2003, more children from low-income families had become Internet users. In 2000, 36.1 percent of all adolescent user families had a monthly income not exceeding 2000 yuan. The percentage, however, grew to 47.2 percent in 2003. Although families with higher incomes are still more likely to have Internet-capable children,

Table 5.3
Distribution of selected professions for the parents of adolescent Internet users in Chinese cities

	Fathers		Mothers	
	2000 (N = 725)	2003 (N = 3036)	2000 (N = 726)	2003 (N = 3089)
Information have-less				
Workers	25.8	50.1	34.0	59.7
Sales and services	15.6	18.1	14.6	14.4
Clerks	10.2	8.5	20.4	14.8
Unemployed	—a	19.7	—a	21.5
Upper class				
Professionals	25.7	27.1	12.0	9.0
Managers and cadres	10.5	18.0	—a	22.0

Sources: Compilation based on Bu and Guo (2000) and Bu and Liu (2003).
a Data unavailable.

Bearing in mind the family background of these young people, the one-child policy makes a critical difference because even though the families are not wealthy, the "little emperors" may still have adequate means to get what they need using the meager income of their parents and grand-parents. This, however, cannot alter the basic financial conditions of working-class families. While have-less young people seek self-identity under the pressures of China's new consumer society, the funds available to them are still limited. Hence, there is a market boom for preowned brand-name mobile phones and laptops, some stolen, some refurbished, to meet the needs of have-less young people.[7]

This pattern of young people spending excessively on working-class ICTs can also be observed in the three-city survey group project conducted in 2002 and 2006.[8] We found that migrants with higher ICT connectivity are more likely to lose control over their ICT budget. After probing several social demographic indicators including income, education, gender, resi-dential tenure, and age, the strongest factor turns out to be age.[9] This means that compared to those older than twenty-five, young have-less migrants are more likely to lose control of their spending on ICT products and services. This is because they are seeking personal identity against the backdrop of the market economy. They are more targeted by advertising and marketing campaigns while also being prone to conform to collective norms set by their peers in their social networks, now increasingly con-

A dramatization of the larger social problem can be found in the movie *Beijing Bicycle* (*shiqisui de danche*), directed by Wang Xiaoshuai and released in 2001. In the film, a Beijing teenager stole the savings of his father, a laid-off worker, to buy a mountain bike from the second-hand market so that he could join his biker friends and be cool. The plot can be easily rendered as about a teenager longing for a mobile phone. But the movie has another equally important character: a teenager from the countryside, the original owner of the bike, who depended on it for his livelihood as a new employee of a package delivery company. Given traffic unpredictability, bikes prove to be the most reliable transport in the city. But his bike was stolen and sold to the teenager from the working-class urban family. The two adolescents fought over the bike. At the end, they had to sympathize with each other and accommodate each other's needs by using the bike alternately. The ending expresses hope that only children may grow up and learn to compromise, something that they may fail to learn in the family.

Important to note here is that it is very common for young people to lose their mobile handset, often their most valuable possession. Theft is a main reason, and it happens in crowded public spaces like buses, cybercafés, and shopping districts, or in other settings like factory dormitories. Where public security enforcement is lax, there are also more robberies targeting have-less youth with expensive mobile phones. Liang, a twenty-three-year-old graduate student in Guangdong, for example, reported that he was robbed twice of his mobile phone on a bus route that he took frequently. "It happened in broad daylight. Several of them [robbers] surrounded me, asking to see my *shouji*. I had no choice. They took it and went off at the next stop. No one dared to say anything." This security problem will be further discussed in chapter 7. But here one should wonder: Where do these stolen or robbed phones go? First to the second-hand market, then to other have-less young people?

The Consequences of Education Reform

If the one-child policy is a unique component of the Chinese situation, the reform of the education system is more universal. It forms another essential social condition facing have-less young people in the evolving network society of urban China. In recent years, the privatization of education and subsequent rise in tuition fees have caused much tension and discontent around the world, particularly among have-less young people in higher education. In May and June 2006 alone, there were major student

protests in Chile and Greece against the commercialization of education (Franklin 2006, Labi 2006). Also following a neoliberal route, China has reformed its education sector since the mid-1990s, which has led to serious disruptions such as the June 2006 student uprising in Zhengzhou, Henan Province (Kahn 2006).

Throughout much of China's history, education has usually been regarded as a public sector and a social equalizer. Beginning in the Han dynasty, Confucian learning offered opportunities for members of the lower class to rise through civil examinations. Until the 1980s, the Communists had broadened the scope of education to peasants and the proletariat working class. Has the equalizing role of education continued into the information age? Or has education been turned into yet another system that reproduces inequality?

A look at the general trend of registered school enrollment shows that overall, the scale of education in China has increased (table 5.4). The one-child policy has led to the declining number of children, which explains the decrease in the number of primary school students. But secondary schools and colleges are gaining pupils. Between 1982 and 2006, the number of middle school students more than doubled. The fastest growth is in higher education, indicated by college enrollment that skyrocketed from 1.15 million in 1982 to 5.86 million in 2000 and then to 27 million in 2006.

While the youth population fell between 1982 and 2004 (table 5.1), total school enrollment climbed from 187.9 million to 239.88 million. As a result, students as a proportion of those aged six to twenty-two rose from 48.3 to 74.2 percent (table 5.2). A small fraction of this increase is from

Table 5.4
School enrollments at the three levels of education, 1982–2004 (in millions)

	Primary school enrollment	Secondary school enrollment	College enrollment	Total school enrollment	Students as a percentage of the population ages 6 to 22
1982	139.72	47.03	1.15	187.90	48.3
1990	122.41	51.05	2.06	175.52	46.9
2000	130.13	85.03	5.86	243.84	68.1
2004	116.30	102.25	21.33	239.88	74.2

Sources: Compilation based on *China Population Statistics Yearbook* (1996) and *Education Statistics Yearbook of China* (2000, 2004).

the expansion of educational services to adults over twenty-two years old. The bulk of growth comes from the sharp rise in technical programs for late teens and those in their early twenties. Be they vocational high schools (zhiye gaozhong) or colleges, these programs offer technical qualifications for gray- and blue-collar jobs as well as starting white-collar jobs, including those who become network labor in China's ICT industry.

In a sense, the formal education system promotes equality in ICT access because the MoE required all urban secondary schools to offer ICT courses by 2001 and all urban primary schools to do so by 2005 (MoE 2003). At the level of higher education, the China Education and Research Network (CERNET) plays an indispensable role by bringing the Internet to some of the most isolated regions, such as Tibet, where CERNET was the only service provider in 2003 (Harwit 2004). Without these efforts, millions of young people would have been unable to learn about ICTs, whether over online computers or through book-based traditional pedagogy.

While most high schools in China have computer classrooms, the percentages are significantly lower in terms of campus networks and among primary schools (table 5.5). Unsurprisingly, computers and networking resources are concentrated in urban areas (Bu and Liu 2003). In most schools, especially in primary and junior high schools, students need to

Table 5.5
Ownership of computer and networking equipment in China's primary and high schools, 2003

	Primary schools	Junior high	Senior high	Full high schools[a]	Total[b]
Number of schools	396,665	62,272	5,910	7,398	472,245
Schools with computer classrooms	61,584	38,070	4,950	5,541	110,145
Schools with campus networks	13,215	7,576	2,567	2,968	26,326
Number of students per computer	52	27	14	15	33
Investment in computer and networking per student (yuan)	173	408	590	612	291

Sources: Data based on National Comprehensive Statistics on Education Equipment in Primary and High Schools (2004).
[a] High schools that have junior and senior highs.
[b] Includes primary and high schools

share computer resources, as can be seen in the number of students per computer terminal. ICT access at school is therefore also in a collective mode as in cybercafés. It is in this sense less exclusive as compared to private ownership, although how to best use these shared computer resources remains an open question.

The expansion of computers and connectivity among secondary schools and colleges does not equate to equality. On the contrary, China's education system, especially after the profit-oriented reforms since mid-1990s, has increasingly become the opposite of a social equalizer. First, in order to privatize education and transform it into an education enterprise (jiaoyu chanyehua), tuition fees have skyrocketed, especially in public schools that make up the bulk of the education sector, causing school dropouts that otherwise would have not happened. The problem has been most acute in rural areas, although there has been some improvement since 2006 when the Chinese government endorsed the policy of free nine-year education in the countryside. Expensive education fees, however, remain a critical issue beyond nine-year education, for rural families as well as those in low-income urban communities, especially children whose parents are laid-off workers (H. Zhao 2005).

Second, the schools themselves exist in a discriminatory environment. It is difficult to ensure equality among the schools or even within them. The distinction between key schools (zhongdian xuexiao) and ordinary ones is a typical system of inequality that privileges schools with more resources and students with higher scores (Yang 2005). Another case in point is schooling for the children of migrant workers in Beijing, which triggered a controversy in 2003–2004 (W. Wang 2003). These children—about 20 million of them at the national scale (D. Yang 2007)—are not registered residents in the city, although their parents have lived and worked there for a number of years. Most of them could not enter schools formally recognized by the education authorities because they lacked residential status. The parents subsequently organized their own schools, although they faced threats of being closed down. The struggle for education, formal and informal, is continuing for have-less young people, particularly those from rural backgrounds who now reside in cities (Huang and Cheng 2005, L. Wang 2006).

Third, as a social institution, schools may play a discriminatory role against working-class ICTs because these are low-end services associated with less wealthy communities and the values embedded in have-less grassroots networks can be at odds with the high-end elite orientation that dominates formal ICT curricula. The most obvious example is teachers'

frequently speaking out against the negative influences of cybercafés as can be seen in news reports. In other cases, some high schools banned the use of Little Smart among students (W. Li 2004). Before they dismiss working-class ICTs, school authorities rarely consider why their students want these ICT services. Does this suggest inadequacy in the school's ability to provide sufficient connectivity to young people? Should they open their computer labs for longer hours and be less authoritarian in managing students' online activity? Should a broader and more practical vision of ICTs be integrated in their teaching?

This is also the case with female Internet dropouts, an odd phenomenon in the affluent Nanhai area of Guangdong Province.[10] Since the late 1990s, Nanhai has been a national model for informatization: all of its local schools offer IT classes using computers beginning in the third grade. However, in 2002, most female members of my focus groups still held the misperception that technology is a male thing. Even teenage girls graduating from high school became Internet dropouts because, as one of them said, "It's impossible for us girls to get a job in the IT business." "The Net is just something for boys to play." It is obvious that their IT classes dealt only with technical issues. The curriculum needs to fill a significant gap in order to counter misperceptions about gender and technology. Here, the disparity between boys and girls was perpetuated through the socialization process, and a large number of the female population became excluded.

The most serious problems facing have-less youth exist in higher education, by far the most rapidly expanding segment of education (table 5.4). The expansion of universities—almost all of them public universities—is a process of "deformed industrialization" (Zhong, Liu, Liu, and Mo 2005, 48). Until the early 1990s, undergraduates not only paid no tuition but also received a modest stipend from the government. The situation began to change after 1998 as universities transformed into for-profit enterprises, charging increasing amounts of tuition and fees for room and board. Concomitantly, large-scale land seizures also occurred to meet the needs of university expansion, thus creating university towns (daxuecheng) in remote suburbs. This is a peculiar spatial component of the new urban landscape, whose market value often rests more on the commercial real estate development at the fringe of these clusters of universities.

The result of such education reform is that college administrators and professors are better paid than in the past, but more students and their families are in debt. Increasing class size leads to a decrease in quality

education, at least with regard to the undergraduate programs that account for the bulk of the new college student population. Although more financial aid has been allocated among students from poor families, this measure is far from sufficient to reduce inequality on the campus.

Moreover, the job market is unprepared for the tremendous upsurge of college graduates. State-owned sectors, which used to provide secure jobs for young graduates, are shrinking. Private enterprises and foreign companies are hiring, but they prefer those with experience. According to the National Development and Reform Commission, at least 60 percent of China's 4.1 million college graduates in 2006 had difficulty finding jobs (Kahn 2006). Hence, the saying that "graduation means unemployment (biye jiushi shiye)," which makes life particularly difficult for those from working-class backgrounds who need to repay student loans (Zhong, Liu, and Mo 2005).

The problems facing new college graduates epitomize the dilemma in China's education reform. On the one hand, insufficient government funding pushes schools into the marketplace, where public schools and the newly emerged private schools compete for students in order to make more money rather than giving every child an equal opportunity through education. On the other hand, class sizes are much larger, thereby compromising quality learning. More students have to take part-time jobs to pay their bills, meaning that they are spending less time studying. On graduation, many of them can find only semiskilled or gray-collar jobs, and so they join the ranks of network labor.

It has also been reported that certain schools forced students into internship positions that essentially exploit child labor for profit, for example, by requiring computer majors to work long hours in online game "gold farms" in Xinjiang, as discussed in more detail in chapter 6 (China Youth Daily 2007). In other cases, needy students from low-income families or new graduates without stable jobs may also be tempted to join the team of network commentators (wangluo pinglunyuan), for instance, in Shanghai (Wu 2007), whose task is to post politically correct messages in Internet discussion forums. This new type of network labor results from the expanding Chinese network state. They are also called "five-mao party (Wumaodang)" because allegedly they are paid 5 mao (a half yuan or 6 cents) for each progovernment post they put online (Li 2007).

Finally, high tuition, substandard teaching, poor job prospects, and the accumulation of discontent build up to major breakdowns unwittingly ignited by critical incidents of mismanagement by school authorities. This was what happened on the campus of Shengda College in Zhengzhou,

Henan Province, in June 2006, which was probably the most violent university uprising in China since 1989.

Shengda was a privately run college founded by a Taiwanese entrepreneur under the state-run Zhengzhou University, a top university in Henan Province. Shengda charged students $ 2,500 a year, which is five times the tuition for Zhengzhou University, in part because Shengda students generally had lesser qualification but would pay extra to be affiliated with Zhengzhou. Money became the equalizer here because Shengda students were promised they would receive diplomas bearing the Zhengzhou University stamp. When the graduating class found out in June 2006 that their diplomas were issued in the name of Shengda College instead of Zhengzhou University, they pillaged campus buildings, clashed with police, and, in a powerful symbolic act, toppled the statue of the college's Taiwanese founder (Kahn 2006).

Shengda was not the only incident of student rage. In December 2005, a similar but smaller-scale protest took place in Dalian involving students in the EastSoft Information Institute (Kahn 2006), one of many newly founded colleges for training software engineers. While MoE officials have publicly denounced turning schools into for-profit enterprises, it remains unclear how, after several years of market-oriented practices, the damages can be undone and how a reasonable level of trust in the education system can be restored among have-less young people and their families.

On the morning of June 16, 2006, right after the revolt in Henan, more than a thousand police sealed the Shengda campus and prevented students from leaving. But the news had spread through students' mobile phones, especially SMS, at the same time as the protest took place in the early morning hours.[11] Media censors quickly clamped down on online discussions about the demonstrations, and Baidu.com, the popular Chinese-language search engine, erased all traces of the event in its search results. But on the Hong Kong-based Google traditional-Chinese search engine, the combination of keywords "Shengda," "student riot," and "blog" generated more than 2,500 results.[12] These include blogs maintained by overseas Chinese students as well as those hidden in domestic Web sites based in mainland China.

To a great extent, have-less young people are deprived of their access to low-cost education and subjected to gloomy job prospects. Yet at the same time, we see the spread of ICT knowledge to a greater portion of society and the formation of grassroots urban networks among have-less youth through the very same institution of schools. The problems triggered by for-profit education reform also force angry youth to roar together—not

only in Zhengzhou and Dalian but also online and in the blogosphere—to protest the unfair situations that they are thrown into. This time, their voices are heard.

Commercializing the Health Care System

As education reform affects have-less young people and their families, the commercialization of China's health system impinges on the lives of everyone, including the younger generation but particularly have-less seniors. Old age, fixed income, and the absence of an effective social safety net make the elderly most vulnerable when health services are privatized. Overall, the conditions for public health in urban China are deteriorating, caused in part by detrimental change in the physical environment as a result of industrialization and urban growth. Factory pollutants are in the soil, car emissions in the air, health hazards in waterways. The environmental consequences of industrialization have a human health cost.

Pollution created by industrialization and urbanization is only one reason for the decline of health conditions. A more immediate reason is the marketization of the health care system, a process that exploits the have-less groups and creates more demand for alternative information and grassroots communication among the information have-less. In China today, "public [state-run] hospitals dominate the market of health services yet they have become for-profit organizations" (Gu, Gao, and Yao 2006, 450).

Consequently, although China's economy is booming and the society is more affluent than in the past, the general conditions for public health are deteriorating and average Chinese are feeling increasingly insecure when faced with disease and accidents. This trend constitutes what Hu Angang (2005), a leading public policy scholar in Beijing, calls a paradox of development (fazhan beilun) . He maintains that the Chinese government has to react to a critical report from the World Health Organization (WHO) based on a study conducted in 2000. In this report, China is ranked number144 in terms of the overall performance of its health system among all of WHO's 191 member states. In regard to social equality in the health system, China is number 188, fourth from the bottom (Liu 2005).

Medical expenses have been increasing at a much faster pace than personal income since the 1990s in both urban and rural areas (Gu, Gao, and Yao 2006). According to the Ministry of Hygiene (MoH), depending on the type of hospital, average fees for seeing a doctor increased eight to ten times between 1993 and 2003 and the expenses for hospitalization six to

nine times (*China Hygiene Statistical Yearbook 2005*). At the same time, public funds are decreasing as a proportion of total investment in health care, although most hospitals nominally remain state-owned public institutions. The number of for-profit clinics has increased and now surpasses those in the nonprofit category. In 2004, only 12.8 percent of hospitals' budgets, even for state-run hospitals, was from the government, whereas a staggering 40.3 percent was from the sales of medicine and another 44.6 percent from fees charged for medical services (*China Hygiene Statistical Yearbook 2005*). In other words, the more that doctors can sell expensive medicine and overpriced services, the more profit they can contribute to their hospitals and, ultimately, to their own salary, following the model of "provider-induced over-consumption" (Gu 2007, 5).

Admittedly the absolute amount of government funds for health care has increased, but the distribution of funds is highly uneven. Most of the additional money goes to the pharmaceutical industry and hospitals rather than disease prevention, although it has been proven that to prevent disease is a much more efficient and economical solution for public health problems than efforts to cure them (Liu 2005). With the outbreak of SARS and the AIDS pandemic, China has given more priority to epidemics. But overall, preventive measures remain the weakest link because they require a lot of input but yield little revenue.

Another set of problems in China's medical system has to do with the waste of scarce health care resources. This is evident as the proportion of occupied hospital beds decreased from 80.9 percent in 1990 to about 60 percent between 1997 and 2001 (Zhou 2005). The average number of patients each doctor treats has also decreased significantly. This does not mean that the health of Chinese people has increased and they do not need to consult doctors as much as in the past. Rather, increasing numbers are deterred by skyrocketing costs for medicine and medical services. The percentage of urban residents who choose not to see a doctor even when they are sick increased from 1.8 percent in 1993 to 16.1 percent in 1998 and then to 20.7 in 2003.[13] Although many hospital beds lay empty in 2003, about 41 percent of low-income urbanites chose not to be hospitalized even though their doctors advised otherwise (Hu 2005). Patients and their families no longer trust information provided by doctors, whose personal interests are too closely intertwined with the medical bill.

China's new pharmaceutical industry also plays a central role in elevating the cost of medicine, especially through pharmaceutical representatives (*yiyao daibiao*) (Zhang 2005). These are employees of the pharmaceutical companies, both multinationals and domestic Chinese firms, who promote

medical products using a combination of kickbacks, personal favors, and interpersonal *guanxi* networks to influence hospitals. Due to these organized legal and "underground" activities, doctors are tempted to prescribe more expensive treatments. In Beijing alone, there were at least ten thousand pharmaceutical representatives in 2005, whose main task was to inflate the cost of medicine in the city (Zhang 2005).

Could there be an organized force to counter the alliance between profit-seeking hospitals and the pharmaceutical industry? Official bodies like the National People's Congress and the State Development and Reform Commission have paid attention to the problem (Pei 2006). High-level MoH cadres have spoken out against the for-profit behaviors (L. He 2005). It has also become common practice for the mass media to carry out investigative journalism reports on the commercialization of the health care system. These are notable improvements compared to a few years ago, but it remains unclear how effectively the price of medicine can be lowered by these measures.

Medical insurance can be an effective structural counterforce to restore checks and balances in the health system. As an industry in itself, insurance companies need to work to prevent the abuse of prescriptions in order to protect their own interests. Yet as shown in table 5.6, overall only a small portion of urban residents have medical insurance. The counterbalancing effect of the insurance companies is therefore minimal, particularly for have-less seniors, most of whom lack insurance coverage.

As of 2003, the largest portion of urban residents (44.8 percent) paid medical expenses from their own pockets. The second largest group (34.4 percent) used social medical insurance (*shehui yiliao baoxian*), a general term for copayment among employee, employer, and the government.

Table 5.6
Percentage of urban residents using different payment types for medical expenses

	1993	1998	2003
Self	27.3	44.1	44.8
Social medical insurance	1.1	4.7	34.4
Cooperative medical insurance	1.6	2.7	6.6
Commercial insurance	3.6	3.7	5.6
Labor-protection medical insurance	48.2	28.7	4.6
Coverage by public funds	18.2	16.0	4.0

Source: National Survey on Hygiene Services (1993, 1998, 2003), cited in Gu, Gao, and Yao (2006).

Together, self-pay and copay cover 79.2 percent of the urban population. Compared with 1993, the most significant change is the decline of labor protection medical insurance (*laobao yiliao*). This is a state-run insurance plan, a legacy of the socialist era, designed for blue-collar workers, like those working in mining, railway, and telecom work units. Labor protection insurance used to be the single largest category, protecting nearly half of China's urban population in 1993. But by 2003, its share had fallen to 4.6 percent. Meanwhile, public funds also plummeted from 18.2 percent to 4.0 percent.

Although insurance covers only a fraction of the total population, the situation is even gloomier for the elderly. According to official statistics, only 33.59 million retirees in 2004 had medical insurance (*Almanac of China's Population* 2005), which represents less than 27 percent of China's 155 million populations above age sixty. In other words, the majority of China's senior citizens had no medical insurance. Yet they have to cope with the reform of the health care system. No wonder have-less seniors look for more trustworthy information, online or through interpersonal networks extended by mobile phones. Using ICTs to seek health information is, of course, a worldwide phenomenon with the spread of Internet (Rice and Katz 2001). But to have-less seniors in China today, rapid commercialization of health care and the collapse of traditional social security system have created a unique set of imperatives for them to seek medical information themselves.

ICT Solutions for the Elderly

The commercialization of health care is having a strong influence on the elderly, although this is only part of the more profound changes in the pension system and the delivery of social services in general. Although more resources are available in the cities for the support of senior citizens than in the countryside, the urban social security system remains fragmented and often ineffective when it comes to have-less seniors in working-class families, for instance, the parents of laid-off workers. The problem of this social deficit has to be solved at the level of public policy given the restructuring of Chinese family. While filial piety (*xiao*) remains a relevant notion, the combination of the one-child policy and rising labor mobility means that during China's transition to a market economy, "the trend of forming nuclear families instead of multigenerational families under one roof runs counter to the needs of the elderly" (England

A telling indicator is the increase in the number of so-called empty-nest households (*kongchao jiating*): households with only senior citizens who either do not have children or do not live with their children. This type of household accounted for 16.7 percent of Chinese families with elderly members in 1987 and 26 percent in 2000 (D. Yang and Zhao 2004). Up to 2004, there were 23.4 million senior citizens living in empty-nest households nationwide.[14] Because of the rising number of seniors living by themselves, there is an urgent need for more supportive measures in the medical system, the pension system, and the social services system overall (R. Huang 2005).

How should this social services system for the elderly be built so that it can perform some of the most crucial functions of the traditional multigenerational family? So far most studies have stressed the physical and economic needs of senior citizens, which explains the abundance of information on the health and pension status of the elderly. In contrast, communication needs are insufficiently emphasized; however, they are at least an equally fundamental service provided by the traditional family for the social and psychological well-being of the senior population. Can this communication function be taken over by working-class ICTs? If so, how?

It is important to note that not just in China but in other countries as well, research findings have indicated that communication is critical to health for the elderly and the process of "successful aging" (Hummert and Nussbaum 2001). Not only could ICTs be used in telemedicine and caretaking for seniors with disease, but they could also strengthen family ties across space and thus function as an important preventive measure for physical and psychological disabilities. After his analysis of Chinese empty-nest households, Huang Runlong provided two policy recommendations that have communication components: establish community-based mutual help groups among the elderly and install telephone lifelines in these empty-nest households so that seniors can call for help in an emergency (Huang 2005). Some local state agencies in Shanghai, Liaoning, and Hubei have provided more support than others in helping foster mutual-help activities on the Internet. However, at the national level, there is no policy structure for ICTs among the elderly, especially among have-less seniors.

We have seen the spread of working-class ICTs among the senior population in Chinese cities, which results largely from bottom-up entrepreneurialism. Most obvious in this trend is the ability of the mobile phone market to better serve elderly users. The diffusion of mobile phones is faster than

the spread of Internet among the elderly. This process began a few years ago when senior family members inherited used mobile phones from their adult children (Xi 2004). More of them are getting new handsets now with more choices in the market. As in the early years of mobile phone diffusion, it used to be the case that one could find only imported models suitable for senior citizens. A popular model among seniors in Shanghai was the Samsung T208, originally launched in the Chinese market in October 2002 to target the upper class. But by the end of 2004, its price had dropped from more than 3,000 yuan ($362) to 1,850 yuan ($223), and it had become a favorite choice for elderly users in the city because it was easy to use (PC Online 2004).

Domestic brands have been catching up in the elderly market. One example is Huali's Old Companion (laoban) handset, costing about 600 yuan ($73) in December 2006. It has big buttons, a large display, amplified sound output, amplified vibration alerts, and an audio reader for time and phone numbers for easy handling of senior citizens, especially those with some health problems. It is also equipped with a radio. This phone has a special key to send emergency information simultaneously to multiple family members and social service organizations. This not only frees them from the trouble of remembering or searching for phone numbers but also helps them save critical time in an emergency. The design and production of this handset was based on the estimate that the elderly market can consume potentially 7 million mobile phones, and the low-end market niche had yet to be tapped (China New Telecom Network 2006).

At the same time, Little Smart handsets makers are marketing products specifically for seniors. For instance, the UT190 handset by UTStarcom has big buttons, a large display, and loud alerts. It also has an FM radio and a red button for emergency calls (China Netizens Daily 2006). Moreover, Little Smart service providers like China Netcom in Qingdao, Shangdong Province, have begun to provide location service that allows subscribers to trace the physical location of their Little Smart handsets. The information can be retrieved by SMS, voice call, or on the Internet. This Little Smart service is reported to be much cheaper than GPS and more precise than similar service through GSM (Xu and Yu 2004). It is particularly popular among seniors with Alzheimer's disease, who may otherwise frequently go astray (Dong 2006). In Qingdao, this location service costs as little as 3 yuan ($0.36) per month, and it can also be used to trace small children or anyone else carrying the handset (Qingdao Morning Post 2006).

This location service is yet another indication that working-class ICTs for the elderly are often appropriated and domesticated in a family setting.

Mobile handsets and services targeting the elderly market have often been promoted as gift items from children to their elderly parents or between senior-aged couples. The spread of these ICT objects itself is likely to be a process that strengthens existing family ties even before the actual use of the technology.

In my own research trips, I have quite commonly encountered seniors using working-class wireless services in various Chinese cities. These include average senior citizens I met on the streets and on public transportation from Beijing to Guangzhou and in small cities as well. They are people like the pensioner in Ningbo who used Little Smart as his only phone line in winter 2004 and my retired uncle with a hearing impairment who bought his SMS-only handset in spring 2006 in the southern city of Ganzhou. My parents who live in Wuhan had also used prepaid GSM service for a few years until they switched to Little Smart in 2005.

Finally, have-less seniors may also use landline phones at home in distinct ways that allow them to stay in touch with their mobile-equipped family members for free. One of them is the practice of beeping: seniors in working families can call someone (usually their adult children in the city) and immediately hang up. This allows the receiver to know who just called and can then return the call. Beeping is quite popular in Africa (Castells, Fernandez-Ardevol, Qiu, and Sey 2006; Donner 2007), but is seldom reported among Chinese user groups except have-less seniors. According to my survey group participants, the elderly in low-income families who have limited technical know-how prefer this practice; some of them do not know how to dial phone numbers correctly, so they just press the redial button to beep their children, and others want to save paying the phone bill.[15] These low-end uses of ICT allow formerly excluded have-less seniors to start enjoy networked connectivity, however limited it may be.

With regard to the Internet, users who are older than sixty account for about 1 percent of all netizens in China (table 5.2). The proportion has been rather stable since 2000. But because the elderly group constitutes more than 12 percent of China's total population and the aging of society is accelerating, it is evident that much remains to be done for the Internet to fully serve senior citizens, especially have-less seniors. Currently, not only is the Internet less popular among the elderly than among the younger generation, but it is also adopted mostly by those who are better educated. The physical challenge of old age is but one of many reasons for this pattern of adoption. Other reasons include the general absence of social

support systems, whether technical or educational. Unlike the younger generation, few have-less seniors belong to any school where they may learn about computers. Even fewer go to cybercafés because they see these places of collective Internet access as something for young consumers only.

However, these seniors generally read newspapers and magazines, and they have been targeted by a number of popular TV programs (for example, *Gorgeous Sunset* or *Xiyanghong* by China Central Television) regularly covering a variety of topics that concern them, such as health, cooking, and family life. As a result, the mass media in general do a better job for have-less seniors than for have-less young people, which at least partially mitigates the informational needs for alternative communication channels among the elderly.

This does not mean that the senior population has not found any use for the Internet. A survey in seven Chinese cities in 2002 discovered that the elderly have been particularly active in searching for medical information on the Internet.[16] This corresponds with my own observation that my parents go online because one of them has a chronic disease and they need to learn as much as possible about prescriptions and treatments for it. It is especially so given the context of the commercialization of the health system, under which it is a routine for them to see multiple doctors whose prescriptions may or may not agree with each other. They always take doctors' advice with a grain of salt and cross-check it with information online.

Even seniors who do not own or do not know how to use computers may ask their children to go online to search for medical and other information for them. The information can then be shared either face-to-face or in phone calls. In this way, access to the Internet is sustained in a collective mode based on the family unit, which has also been extended locally and translocally due to the diffusion of working-class ICTs.

Beyond the family level, we have begun to see organized efforts to bring the elderly online, such as the North China Seniors Network and Honggen Seniors Place in Hubei, Central China. The best-known Web site for elderly users is probably Old Kids (*laoxiaohai*) in Shanghai, the city with the highest percentage of old-age residents in China.[17] Founded in 2000 by three graduates of top universities in the city, the Web site endeavors to help the elderly go online. This dot-com works closely with the Commission for the Elderly (*laolingwei*) under Shanghai Municipality.[18] Its activities are both on and off the Net, including Internet schools that have trained more than 50,000 senior netizens (Y. Zhong 2004). In addition to serving

the elderly, they also bring together the young and the old through Internet-related activities.

At the beginning, Old Kids was exclusively for highly educated retirees, such as those belonging to the Association of Elderly Science and Technology Workers in Shanghai, an institutional partner of the Web site since October 2000. But since June 2001, the site has entered Shanghai's ordinary residential communities to promote Internet knowledge among a wider scope of senior citizens. It has collaborated with Shanghai Oriental Radio Station in launching two popular programs, Senior Classroom (*laonian xuetang*) and 792 Internet Time-Space (*792wangluo shikong*), so that average members of the elderly population can learn about Internet technologies. As of July 2006, Old Kids was sending out approximately 12,000 monthly newsletters to its members, who need to contribute only 2 yuan ($0.24) each month as the membership fee.[19]

ICTs as Welfare? Chances and Challenges

Lower-mobility people have begun to adopt the Internet and mobile phones in order to adjust to the rapidly changing network society of contemporary China. This presents an equally pivotal process as the adoption and appropriation of low-end ICTs among higher-mobility members of the information have-less. In the first process, as discussed in chapter 4 and visualized in figure 5.1, migrant workers and laid-off workers join the ranks
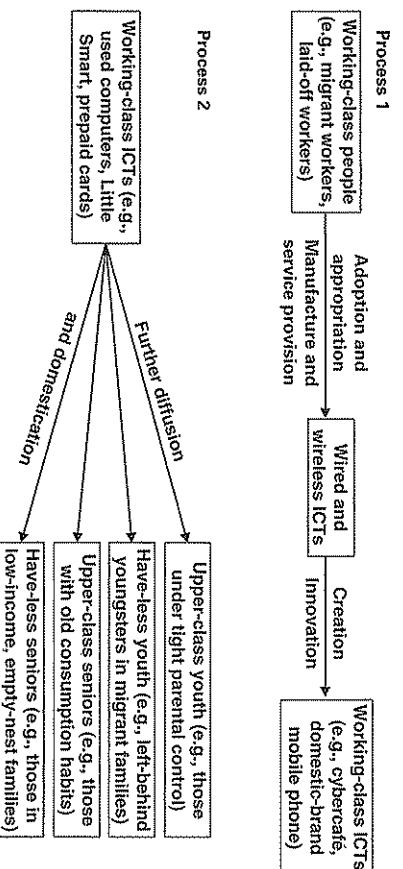
Process 1

Working-class people (e.g., migrant workers, laid-off workers) → Adoption and appropriation → Wired and wireless ICTs

Manufacture and service provision → Creation Innovation → Working-class ICTs (e.g., cybercafé, domestic-brand mobile phone)

Process 2

Working-class ICTs (e.g., used computers, Little Smart, prepaid cards)

Further diffusion and domestication →

- Upper-class youth (e.g., those under tight parental control)
- Have-less youth (e.g., left-behind youngsters in migrant families)
- Upper-class seniors (e.g., those with old consumption habits)
- Have-less seniors (e.g., those in low-income, empty-nest families)

Figure 5.1
The information have-less and working-class ICTs: Adoption, appropriation, innovation, and domestication.

of network labor in creating and shaping working-class ICTs. In the second, and equally important, process, the further diffusion and domestication of working-class ICTs transcend its initial technosocial basis of the urban underclass to a much wider scope of families across class and strata. This is a crucial development because it extends networked connectivity to the formerly excluded young people and seniors in both upper-class and have-less families. This spread enlarges the social demographic reach of working-class ICTs and, in so doing, creates more working-class jobs. It also highlights structural changes in the family unit itself, which functions as another micro, yet collective, mode of problem solving amid macro social transformations.

With the passing of the traditional multigenerational family and the overall commercialization of social services, both the old and the young have become more vulnerable than before, for the public institutions that used to provide shelter, such as education and health, have now been turned into for-profit organizations. Microlevel solutions, however effective they are in the grassroots networks of individuals and families, cannot fundamentally alter the status quo at the system level. A similar process of commercialization also characterizes the ICT sector.

In order to solve these problems, and include rather than exclude the have-less, it is essential to rethink and reform education, public health, and social services, at the very least to prevent them from further marginalizing the less powerful and less affluent. In terms of ICTs and urban communication systems at large, the most profound challenge starts with rethinking and reimagining the basic social roles of the technologies. Can we conceive of an information industry that takes services for the young and the old as a pillar of its operation, not just for profit, but for public good as well? A network society based on the inclusion of have-less as much as it relies on the haves and have-mores? Currently the market value of the young and the old has begun to be recognized. Some of them have joined network labor, such as underaged online game workers (H. He 2005). But these are just signs of the beginning that may or may not be translated into autonomy, power, and self-efficacy—and may even lead to the further subjugation of less mobile populations.

In September 2005, the Zhengzhou Institute of Aeronautical Industry Management declined applications for student loans on the ground that the applicants possessed mobile phones (Wu 2005). In October 2006, the Jinan Bureau of Civil Affairs issued a new procedure that would disqualify two

types of people from applying for low-income welfare: those who had purchased computers in the previous year and those who used a mobile phone regularly (Qiao 2006). Both incidents triggered nationwide public debate, in print and broadcasting media as well as online forums and the blogosphere.

This was the first wave of serious discussion regarding welfare provision and the information have-less, signaling that it is time to reconsider the social role of ICTs in a different light—not as a tool of profit making but as welfare, a mechanism of equity and social inclusion beyond computers in the classroom, beyond telemedicine, beyond conspicuous consumption, or any short-term uses of ICTs for economic development. Many of the basic issues here have been discussed in international forums such as the World Summit on the Information Society (WSIS). In the context of urban China, it is imperative to address the problems at a system level that takes the needs of young people and the worries of the aging society as a fundamental dimension of its long-term operation.

The loaded term welfare of course entails a few caveats. First, the idea of ICTs as welfare foregrounds communication as a basic human right, thus calling for welfare policies for the less mobile and more vulnerable populations as a basis of a more inclusive network society. While basic life necessities like food and shelter remain important in the welfare system, in the contemporary world characterized by the wide spread of ICTs, the notion of welfare has to be expanded to cover the informational needs of have-less people, particularly the young and the old.

Second, fundamentally different from the past passive welfare policies imposed from top down, ICT welfare policies need to be built from the bottom up. Participation is the key for the have-less to take part in the decision-making process through their working-class ICTs as well as more traditional involvement. Good welfare relies on what the people need, whether the have-less are treated with respect in program design, and to what extent they are involved as actors or even providers rather than mere consumers of information services—so that have-less young people and have-less seniors are socially uplifted in addition to the purely instrumental benefits they receive.

Third, the notion of ICTs as welfare should include all stakeholders in both the public and private sectors following the multistake holder approach proposed by WSIS (Padovani and Nordenstreng 2004). In urban China today, successful involvement of the government, especially at the local level, is fundamental to the long-term sustainability of any welfare program. It is true that in certain cities, predatory local officials have posed

threats to working-class ICTs, and in general they are more concerned about upper-class than lower-class interests. But this does not mean that local government is always hostile to have-less people. On the contrary, if we look at the places with the most vibrant working-class ICTs, the local governments are almost always central to their local structure of policy support, for example, in the case of the Old Kids Web site in Shanghai, with its close ties to the Municipal Commission for the Elderly, as well as the social support group for left-behind children in Hunan, sponsored by the Provincial Committee of the Communist Youth League (Bu 2008),[20]

The central role of the local state is evident in the prospering of cybercafés in Shenzhen and the growth of Little Smart wireless service in China's second- and third-tier cities. It is important to note that the local government is seldom involved as the sole ICT service provider in any of these cases, whose success depends on the involvement of the business community. In other words, the local state is central in that mayors and local telecom authorities are in the best position to motivate the private sector by providing supportive policy. After this initial stage, it is up to entrepreneurs to decide what the information needs are, where the next site of service delivery should be, and how to conduct their business: via Internet or mobile phone or other local and translocal networks.

The consortia behind successful ICT welfare delivery can create working-class jobs in local communities, bringing income, respect, and sustainable lifestyle to the young and the old who are now at the margins of society. Low-end ICTs like SMS and cybercafés can be used to deliver new types of social services. Or they can help enhance existing services through shared access that is inexpensive yet convenient, for example, the distribution of information for preventive medicine through SMS. In so doing, public institutions like universities and hospitals can be reconfigured into crucial platforms on which working-class ICTs are developed for have-less populations with lower mobility. For instance, in Norway, SINTEF (the Foundation for Scientific and Industrial Research) at the Norwegian Institute of Technology organized a workshop in 2006 designed to facilitate the creation of ICT systems that "seek to improve elderly peoples' access to social services."[21] In other Western countries, the Internet has helped hospitals in delivering and improving their services through the use of Web sites, mailing lists, and online databases (Rice and Katz 2001).

The issue is particularly imperative for the elderly population because China already has 1 million Internet users above age sixty; throughout the country, but most typically in the rust belts of the northeast, the aging ... class of the Maoist era has been suffering greatly from the

commercialization of medical services. Not only is the level of technophobia high among this age group, but they also have little access to technical support and training in accessing alternative information. Even for the better-educated seniors, we do not know how well they are using online information, especially given findings in the Western context that online health information may also mislead and cause hazards if patients and their families are not provided with proper guidance (Cline and Haynes 2001).

To develop a full-fledged ICT welfare policy for the elderly is not just about the technology. Helping seniors to go online, providing them with quality health information on Web pages or SMS requires organized efforts from not only the ICT industry but, more important, traditional social service providers in the government, nongovernmental organizations, and local communities. Fundamental to all these is how a rapidly changing country like China should handle the human cost of modernization and how the industrializing society can prepare itself for aging, using working-class ICTs as a more efficient means for content and service delivery to the family and as a more effective means for community participation.

Unlike the elderly, have-less young people face another set of challenges. Most of them are acquiring ICT knowledge and skills thanks to schooling as well as advertising that targets them. These advertising and marketing campaigns are a major factor behind the contemporary Chinese youth culture sustained online and through mobile phones. It has been quite common for China's younger generation to use working-class ICTs to strengthen and extend their interpersonal ties, thus forming informal networks of information and technical support that are supplementary to the key institutions of education and family.

According to a survey conducted in Fujian Province in 2001, the Internet has become an essential information source for college students to learn about sex and sexuality (Q. Chen 2001). But what kinds of informal sex education are young people receiving in cyberspace? The answer is commodified body images, sexist jokes, and the online promotion of adult products that reflect and reproduce existing social inequalities of gender, class, and ethnicity. Much of these come through mainstream Internet portals and telecom service providers, who exploit the curiosity and susceptibility of young people to maximize corporate profit.

In more general terms, Chinese young people today are vulnerable to excessive commercialization, which is particularly true of those from working-class families because they are overwhelmingly spoiled only

children. At the beginning of new semesters, they often spend a lot, purchasing expensive products including the latest models of handsets, some even spending the equivalent of their living costs for an entire semester within a few days (Pang 2003). If the notion of ICTs as welfare can be introduced to social policies for have-less young people, the first challenge is how ICTs can be separated from conspicuous consumption and how the dissemination of ICTs can become a process that promotes equality rather than the exclusion or demeaning of the less affluent and less powerful.

The challenge of commercialization is not only a problem facing young people. The basic living conditions of low-mobility groups are changing because the old safety net and traditional social equalizers have disappeared and the new ones have yet to take shape to deliver badly needed public good. It is therefore a fundamental task to bring the notion of welfare back in for both the young and the old. In retrospect, most problems facing have-less young people and have-less seniors are rooted in the lack of wider social participation and the domination of elite opinions. The power imbalance explains the hasty commercialization of public institutions as well as the prevalence of consumer culture, both influencing the development of working-class ICTs. Although domestic companies and multinationals have recognized the market value of have-less users, the recognition stays at the level of consumption that carries only superficial and temporary commitments to the information have-less. In this sense, the most fundamental driving force for the rise of have-less people and working-class ICTs is not commercial interests or state policy. Instead, it is the bottom-up informational needs of people, young and old, to deal with their existential issues at the grassroots level of the enlarged network society.

III A New Working Class in the Making

Documentaries and Animation

Ode to Ma Jiajue: http://www.flash8.net/flash/15776.shtml

Chinese Gold Farmers: http://www.chinesegoldfarmers.com/

E-Commerce Platforms

China Used Computer Network: http://www.2it.com.cn/

China Used Handset Network: http://www.2sjsi.com/

Flea Channel: http://flea.zol.com.cn/

Taobao Net: http://www.taobao.com/

Huanla Barter Net: http://www.huanla.com/

Wuhan Barter Net: http://www.e1515.com/

Dafen Village Oil Paintings: http://www.dafencun.com.cn/

Shipai Village Information: http://www.shipaicun.com/

Nongovernmental and Nonprofit Organizations

New Labor Art Troupe: http://www.dashengchang.org.cn/

Net for Migrant Youth Labor Force: http://www.dgqn.net/

Old Kids Network: http://www.oldkids.cn/

Education Network for Liushou Kids: http://www.liushouedu.com/

Migrant Workers' Network: http://www.mingong123.com/

China Labor Forum: http://www.labourforum.com/

Family of Floating Population: http://www.ldrkzj.com/

Notes

Chapter 1

1. See chapters 4 and 5 for more systematic discussion on the demographic estimates.

2. The survey was conducted by the Informatization Office of Beijing Municipality in 2005 among long-term residents and migrants in Beijing's eight urban and four suburban districts. It measured respondents' technosocial positioning along four dimensions: (1) ownership and access to ICTs, (2) ICT knowledge and skills, (3) behavioral patterns related to ICTs, and (4) attitudes toward and benefits gained from ICTs. Detailed explanation on methods and implementation procedures is available in the Informatization Office of Beijing Municipality (2005, 2–12).

3. *Informationalism* refers to the contemporary mode of production that relies on the processing of information technology and ICT-based innovation for the generation of wealth. See Castells (1996).

4. By "self-programmable labor" and "generic labor," Castells (1998) understands the better-paid and skilled employees who enjoy more work autonomy but need to constantly update their skills and knowledge by themselves due to increasing competition in the labor market (i.e., "self-programmable labor") and those who are unskilled, or whose skills are regarded as valueless and disposable in the new economy and can only sell their physical labor with minimum knowledge/expertise input for very low wages (i.e., "generic labor"). I propose to add "programmable labor" as a specific layer of workers that emerges between self-programmable and generic labor in the context of China's new ICT industry. See detailed discussions in chapters 4 and 6.

Chapter 2

1. See Whyte (1955) for his classic work on street corner societies. Chapters 6 and 7 in this book more systematically examine China's street corner societies and working-class ICTs in the urban context.

13. Fieldwork in Guangdong (June–August 2002), Shanghai (December 2003–January 2004), and Beijing (July 2005).

14. See Katz and Aakhus (2002) and Fortunati, Katz, and Riccini (2003) for discussions on this phenomenon in contexts other than China.

15. See the company Web site at http://www.venusense.com/ (accessed on February 20, 2008).

16. Focus groups conducted in Shanghai (January 2004) and Guangdong (January–March 2006).

17. See the discussions in chapter 2.

18. Focus groups in Guangzhou, Shenzhen, and Zhuhai, July–August 2002 and January–March 2006.

Chapter 4

1. General Office of the State Council, "Announcement on Improving Employment Management and Services for Rural-to-Urban Peasant Workers," January 15, 2003.

2. *China Population Statistics Yearbook* (2005, 315).

3. See chapter 6 for more discussion on urban villages.

4. Notably, total urban employment was 264.76 million in 2004. Thus, there are still other employees besides the 164.5 million shown in table 4.2.

5. Calculated in current prices by *Annual Economic Report of China* (1981). Comparatively, the increase of industrial output was about thirty-five times during the twenty-five years from 1979 to 2004, as calculated in current prices based on *China Economic Yearbook* (2005).

6. Hence scholars like Hui Wang (2004) argue that the persistent influence of the Cold War in the Asian Pacific is an integral part of the region's economic achievements in recent decades.

7. In table 4.5, the 1985 and 1995 data were from the former Ministry of Electronic Industry (MEI), whereas the 2004 data were from the Ministry of Information Industry (MII). There is inconsistency in how they define the electronics industry. It is therefore more important to look at the structural composition under different ownership systems rather than the aggregated totals.

8. *Research Report on China's Exports of Electronic and Information Products* (2004). Beijing: China Economic Publishing House, p. 55.

9. Interviews with cybercafé operators in Sichuan (May 2002), Zhejiang (December 2003), and Guangdong (summer 2002, spring–summer 2005).

10. Interview with Li Dongming, director of China Social Survey Research Institute.

11. Focus groups in Shenzhen (August 2002, February 2006), Zhuhai (July 2002, April 2006), and Guangzhou (August 2002, March 2006).

12. Personal interview with MMORPG virtual property trader (Guangzhou, March 2006); see also Chew and Fung (2007).

13. Focus group with students in Shanghai (January 2004) and Shenzhen (December 2005) and with migrant workers in Guangzhou (February 2006) and Shenzhen (January 2006).

14. Some of these top-level Internet policymakers in Beijing basically laughed at me when I raised the problem of female Internet dropouts to them in a meeting in 2005. See chapter 5 for a full discussion on the curricula design of ICT classes in high schools that did a poor job of treating gender issues.

15. C. K. Lee (1998) and Pun (2005) offer detailed accounts of the work conditions in electronics factories in Shenzhen.

16. See the detailed descriptions on the role of mistress (*xiaojie*) in linking businessmen with local officials in X. Liu (2002). See also T. Zheng (2004).

17. Focus group findings from Zhuhai, March 2006.

18. Personal interview with Deng Qiyao, Guangzhou (January 2007). Deng conducts regular fieldwork in the ethnic regions of southwest China.

19. Personal interviews, Sichuan Province (May 2002).

20. *China Demographic Science*, 1998(5); cited in Yu and Ding (2004).

21. Calculation based on MII monthly reports for the telecom industry. Note that the landline figures include Little Smart using MII's regulatory definition.

22. Personal interview, Shenzhen, July 2002.

23. Creative Commons is a nonprofit organization that helps digital content producers to distribute and share their products legally outside the control of large media corporations. Creative Commons–Mainland China is the chapter of Creative Commons in mainland China. For more information, see http://creativecommons.org/international/cn/.

24. See http://sh.netsh.com/bbs/8832/ (accessed on February 25, 2008).

Chapter 5

1. The "three mountains" is a metaphor used in the Chinese Communist revolution to refer to the domination of imperialism, feudalism, and bureau...

In the context of contemporary urban China, the new three mountains stand for the heavy burden imposed by for-profit reform in housing, health care, and education.

2. MoE, "Guidelines on Accelerating the Construction of Information Technology Curricula in Middle Schools and Primary Schools (in Chinese)." http://www.edu.cn/20030210/3077057.shtml (accessed on July 3, 2006).

3. Fieldwork in Wuhan, Shanghai, and Beijing (summer 2002 and winter 2004). Survey in Guangzhou, Shenzhen, and Zhuhai (summer 2002 and spring 2006).

4. China Market and Research (2004), quoted in *China New Telecom Network* (2006).

5. Seniors aged fifty-five to sixty-five represent 9.88 percent of China's total urban population, *Almanac of China's Population* (2005).

6. Focus group with college students in Shenzhen, January 7, 2006.

7. See Qiu (forthcoming) for discussions on the global flows of used computers into China.

8. See chapter 5 and the methodological appendix for detailed explanations for this project and the survey group design.

9. If the sample is split into younger migrants (age twenty-five or under) and older migrants (twenty-five or older), then the relationship of stronger ICT connectivity and less control over ICT budget, is much more prominent among younger migrants (coefficient = .45, $p < .001$) than older ones (coefficient = .21, $p < .05$).

10. Focus group in Nanhai (July 2002).

11. See http://blog.chinesenewsnet.com/?p=12467 (accessed on July 8, 2006).

12. Search conducted on July 8, 2006.

13. National Survey on Hygiene Services (1993, 1998, 2003), cited in Gu, Gao, and Yao (2006).

14. China Market and Research (2004), quoted in *China New Telecom Network* (2006).

15. See chapter 5 and the methodological appendix for detailed explanations for this project and the survey group design.

16. The survey was carried out by a group of medical researchers from the University of Southern California in 2002. Personal interview with Ping Sun, a member of the research group (May 2003, Los Angeles).

17. See http://oldkids.com.cn/ (accessed on July 11, 2006).

18. See the brief introduction of the Web site at www.oldkis.com.cn/main/about/ [...]

19. Telephone interview with administrative staff at Old Kids, July 11, 2006.

20. See the Web site for left-behind children at http://www.liushouedu.com/English.aspx (accessed on March 2, 2008).

21. See the workshop's Web site at http://www.sintef.no/content/page1_9425.aspx (accessed on July 14, 2006).

Chapter 6

1. See the discussion in chapter 4 about Chinese online-game "gold farmers" and their "guilds."

2. Interview with a taxi driver in Guangzhou (January 2007).

3. For a focused discussion on the reproduction of the *danwei* system in Beijing's high-tech sector, see Francis (1996).

4. See the Dafen Village oil painting selling Web site at http://www.dafencun.com.cn/index_en.asp (accessed on March 4, 2008).

5. Interview with urban village residents in Guangzhou (April–October 2007) and Shenzhen (December 2007).

6. *China Demographic Science*, 1998(5), cited in Yu and Ding (2004, 34).

7. Focus group discussion with residents of Shipai Village (September 2007).

8. Ibid.

9. Interview with a manager in the Pacific Computer City (October 2007).

10. See http://2it.com.cn for the company Web site (accessed on March 5, 2008).

11. Author's translation. Quoted from Zheng (2006, 161).

12. See Walcott (2003) for the development of Chinese high-tech parks. See chapter 4 for the rise of electronics as a main category of China's exports to the world.

13. See the discussion in chapter 4.

14. See the methodological appendix and the discussion in chapter 4 about the survey groups.

15. Interview with a former member of the factory managerial staff (Shenzhen, January 2006).

16. See the fuller discussion in Qiu (2007b).

17. Zhang and Li (2006). The original Chinese article is no longer available online. The story was translated into English by Roland Soong and, with photographs, posted at http://www.zonaeuropa.com/20060623_1.htm (accessed on August 10, 2006).

18. Personal communication with graduate students at the Shenzhen campus of Peking University, which is located next to a community of migrant workers (June 2007).

19. See the methodological appendix and the discussion in chapter 4 about the survey groups.

20. *Investigation Report* (*diaocha baogao*) compiled by labor organizers in Shenzhen in April 2005, provided by Pun Ngai.

21. See http://www.blogcn.com/user24/unidenppl/blogs (accessed on December 21, 2004). A few weeks after the strike, most of the contentious information about Uniden on this blog was removed. In summer 2006, it was closed down.

22. See the related discussions in chapters 2 and 4.

Chapter 7

1. A good example is the effort of a lawyer in Beijing, Pu Cunxin, who used SMS and a blog to commemorate the 1989 Tiananmen tragedy on June 3, 2006. See Pu (2006).

2. See chapter 3 for discussions on SMS-based charging schemes and their problems—for example, migrant workers being charged for content they never ordered.

3. Findings from the migrants' focus group conducted in Shenzhen in spring 2006. In summer 2002, I also came across a migrant next to the Guangzhou East Railway Station who tried to sell his pager after his wallet was stolen.

4. See the discussion in chapter 2.

5. See chapter 4 and the methodological appendix for the survey group design.

6. Personal communication with a student who has family in Zhuhai (April 2006, Hong Kong).

7. See also the discussion in chapter 2.

8. This quotation from the news report is probably from the legal verdict. But Zhang is in fact a cybercafé operator, which contradicts her "unemployment" status.

9. See http://news.sina.com.cn/z/wangba/index.shtml for a comprehensive collection of reports on this incident (accessed on March 7, 2008).

10. See a comprehensive listing of the unfortunate incidents at China Education Online BBS: http://bbs.eduol.cn/printpage.asp?BoardID=14&ID=65147 (accessed on August 18, 2006).

11. See the related discussion on *hukou* and *zanzhuzheng* in chapter 6.

12. Interviews with Chen Feng by telephone and e-mail, November 2004.

13. Each cell is called a *cang*. Since it is routine for every newcomer to receive at least one beating, the physical abuse of new arrivals is called *guocanggui*, or "passing the routine of the cell."

14. Defense statement by Ma Jiajue's lawyer.

15. Ibid.

16. Ibid.

17. Search conducted on Baidu.com on August 26, 2006. See http://wang123654789wang.blogchina.com/ for full text (accessed on August 26, 2006).

18. For an introduction and screenshots of the DV films, see http://bn.sina.com.cn/dv/2006-01-23/152813924.html and http://cnsn.com.cn/edunewsview.asp?id=10088 (accessed on August 15, 2006).

19. See http://www.flash8.net/flash/15776.shtml (accessed on August 15, 2006).

20. Defense statement of Ma Jiajue's lawyer.

21. Interview with taxi driver in Guangzhou (January 2007).

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