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The Development, Current State, and Effects of Community Informatization in Mainland China

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ABSTRACT

In recent years, community informatization initiatives have developed throughout mainland China. The meaning of “community informatization” in China is similar to “community informatics” in the U.S. This paper aims to investigate the current state of community informatization in mainland China—with a focus on best practices, major challenges, patterns of development, developing trends, and effects. Comparing the theory and practice of China’s community informatization to community informatics in other countries, especially in the U.S. and Europe, this paper asks: can government-sponsored or independent informatization efforts bridge the digital divide and help China realize digital—or information—equity?

INTRODUCTION

Recently in China, the idea that *informatization* constitutes an important part of the process of all-round development and social progress has taken hold. This idea now plays an important role in both Chinese political discourse and daily life. At this critical stage in the full construction of an affluent society in China, the Communist Party of China (CPC) has attached great importance to informatization. Hu Jintao, for instance, mentioned the subject nineteen times in his report on the Eighteenth National Congress of the CPC held on November 8, 2012. Significantly raising the informatization level has been included in the goals of establishing an all-around affluent society. Indeed, informatization itself is no longer just a means to an end; it has become a development target in and of itself.

One example of this sort of work is the first community informatization initiative, which began in the Machang Subdistrict in Hexi District in Tianjin in 1998. As Liu (2007) reports, this project connected the subdistrict

(the basic government office in urban areas in China) to the community committee (the basic autonomous organization in urban areas in China) via dial-up networks. By the end of 2005, these efforts had grown exponentially. By then, another project—named E-service for Community—had connected all twelve community committees in this subdistrict. E-Service for Community offered residents of these subdistricts public internet and e-government services related to employment, family planning, and maternal and child health.

Community informatization efforts are exerting a subtle but far-reaching effect over life in contemporary China. They have affected the shape of community development efforts and urban living conditions, and attracted the attention of social workers, information managers, and IT experts. They touch so many important areas of life in China that they cannot be ignored. And when viewed in relation to LIS issues such as the digital divide and digital equality, community informatization is an especially compelling phenomenon.

This paper aims to describe the current state of community informatization development in China through an investigation of the content, strategies, development patterns, best practices, actual effects, major problems, and challenges of this work. The authors are especially interested in understanding the ways that this work is helping to bridge the digital divide and promote digital equity. Theoretically, this essay compares China's community informatization and community informatics practice with community informatics theory from other places in the world, especially the U.S. and Europe. What characteristics are common across these national borders? And what lessons can we learn from this work?

Community, or She Qu 社区

The closest word to “community” in Chinese is *she qu* 社区, following the first translation by Fei Xiaotong 费孝通, a famous Chinese scholar in the field of sociology, in 1933. Liu 刘杰 and Peng 彭宗正 (2005) defines its meaning as follows:

As far as China is concerned, the “community” mainly refers to an urban community, with a specified fraction of the city's entire population, a geographical community with a specific culture, organizational systems, way of life, and a sense of belonging to the community. It always appears as an area under the jurisdiction of an agency of government—[either] neighborhood offices or subdistrict offices. (pp. 4–5)

In other words, in mainland China, in an urban residential area a community, *she qu* 社区, consists of residential units called residential quarters 小区. In these areas, residents live under the administration of a subdistrict 街道办事处. Several adjacent communities or one large community always have a community committee 居委会, a quasi-political agency serving the residents. For example, the Yanyuan subdistrict, an agency of the Haidian

District government, performs administrative functions at the grassroots level in the area of Peking University. Seven community *she qu*—including Zhongguan Park Community, Changchun Park Community, and Weixiu Park Community—fall under the Yanyuan subdistrict’s jurisdiction. Each of these communities also has its own local committee through which residents can obtain a range of services, both public (such as social security) and private (such as house maintenance).

The community committee 居委会, an autonomous organization of urban residents that works closely with local government, is uniquely Chinese in nature. According to Zhu (2008), the first community committee was organized in 1954; the institution has played an important role in urban life ever since. It shoulders a good portion of local governments’ administrative burdens in contemporary China. Its jurisdiction is loosely equivalent to that of a “neighborhood,” though these are not entirely corresponding concepts.

Chinese community informatization efforts have been largely organized around these subdistrict offices, in collaboration with city and district governments, community committees, the communities themselves, property companies, and other relevant organizations. The projects have taken two main forms: top-down (via the extension of e-government to the public), and bottom-up (in the form of autonomous efforts mainly on the part of the community committee and other residential organizations). Although the earliest informatization work was undertaken by residential organizations, it is now the top-down method that is most prevalent in contemporary China.

Literature Review

A keyword search (performed on November 20, 2012) in the CNKI¹ databases of periodicals, dissertations, and proceedings returned more than 1600 Chinese articles related to community informatization. The first was a short report (Jiang 蒋睿 & Jiang 蒋泽民, 1998) about the experience of community informatization in the city of Changzhou in Jiangsu Province in East China. In the years following that publication, research in this area steadily increased. Statistical analysis of the distribution of the fields and authors related to community informatization show a characteristic of centralization (see table 1 and table 2).

There are two main approaches to research in community informatization. The first focuses almost exclusively on the implementation of technology. The second approach looks at a range of factors within this process. Cai 蔡大鹏 (2009, p. 5) espouses the former view, describing community informatization as the process of using information and communications technology (ICT), especially internet technology, to build an application platform and channel for public services. The goal of these services is to create links between community systems so that members of

Table 1. Top15 Fields in Community Informatization Studies in China

| Rank | Field | Quantity |
|------|--|----------|
| 1 | Economy of information and postal service | 482 |
| 2 | Politics | 252 |
| 3 | Health policy and law research | 132 |
| 4 | Computer software and application | 96 |
| 5 | Public administration | 66 |
| 6 | Macroeconomic management and sustainable development | 54 |
| 7 | Sociology | 51 |
| 8 | Education | 28 |
| 9 | Public security | 23 |
| 10 | Communication and media | 18 |
| 11 | Investment | 13 |
| 12 | Party and nongovernment organizations | 10 |
| 12 | Library and information science | 10 |
| 14 | Demography and family planning | 9 |
| 15 | Agriculture | 8 |

Table 2. Top 15 Authors of Community Informatization Studies in China

| Rank | Author | Institution | No. of Articles |
|------|--------------------|---|-----------------|
| 1 | Zou Kai 邹凯 | Xiangtan University 湘潭大学 | 6 |
| 2 | Zhang Hongxing 张红星 | Lanzhou University of Technology 兰州理工大学 | 5 |
| 3 | Yang Li 杨莉 | Lanzhou University of Technology 兰州理工大学 | 4 |
| 3 | Song Xudong 宋旭东 | Dalian University of Technology 大连理工大学 | 4 |
| 3 | Ma Gesheng 马葛生 | Xiangtan University 湘潭大学 | 4 |
| 3 | Bao Yong 鲍勇 | Shanghai Jiaotong University 上海交通大学 | 4 |
| 4 | Wu Yuansheng 吴元升 | Anhui University of Finance and Economics 安徽财经大学 | 3 |
| 4 | Jian Jie 蹇洁 | Chongqing University of Posts and Telecommunications 重庆邮电大学 | 3 |
| 4 | Wen Pingchuan 温平川 | Chongqing University of Posts & Telecommunications 重庆邮电大学 | 3 |
| 4 | Wu Jianjun 武建军 | Chongqing University of Posts and Telecommunications 重庆邮电大学 | 3 |
| 4 | TuMeizeng 屠梅曾 | Shanghai Jiaotong University 上海交通大学 | 3 |
| 4 | Song Yu 宋煜 | Institute of Sociology, Chinese Academy of Social Sciences 中国社会科学院社会学研究所 | 3 |
| 4 | TianGuiyong 田桂勇 | Chongqing Institute of Standardization 重庆市标准化研究所 | 3 |
| 4 | Sun Yi 孙翊 | Institute of Policy and Management, Chinese Academy of Sciences 中国科学院科技政策与管理科学研究所 | 3 |
| 4 | Ma Shengnan 马胜男 | China National Institute of Standardization 中国标准化研究院 | 3 |

the public can more conveniently communicate with each other and more effectively develop and share information resources. The central objectives of this sort of project is improvement of the community's quality of life and overall social progress. Meanwhile Zhang 张楚文 (2011, p. 1) has suggested that community informatization projects directly impact the level of safety, security, and service in a given community. In his view, the key factors (p. 18) for the realization of community informatization include grid management, information-resource management, supply-chain management, and flexible-resource management.

Other scholars recognize that community informatization is not simply about building ICT infrastructure but also requires profound societal shifts. Jian 蹇洁, Wen 温平川, and Liu 刘显忠 (2008, p. 5) propose that community informatization requires the extension of e-government and e-commerce into a community; doing so would make it a critical nerve center of an information society. Taking a different approach, Wang Ying 王颖 (2012, p. 1) argues that there are three crucial preconditions for community informatization. The first is economic and social transformation: building a harmonious and people-oriented society, a service-oriented government, and coordinated social and economic development. The second one is ICT background. While the possibilities for community informatization are multiplied by more sophisticated and readily available ICT, Wang believes that the basis for this work has to be the community's own goals. His third precondition is the development of methods for sharing, integration, and interoperability—concepts that help different groups such as community workers (the staff of community committees; perhaps “quasi-civil servants” is more accurate), IT experts, and community research experts come together. This achieves the integration of ICT and community administration. Wang (p. 14) then puts forward a framework for community informatization in China, which specifies one “basis” and two “orientations.” The one “basis” is residents' aspirations and community autonomy; the two “orientations” are community-oriented public service (which can be understood as e-government) and community-oriented commercial service (which can be understood as e-commerce). These three key components, Wang argues, should be central to the community public platform. In his view, rather than passive recipients of government aid, community residents are important agents in the process of informatization.

Ye 叶裕民 (2008) and Li 李东泉 and Liu 刘晓玲 (2009) propose a digitized urban management model, Citi-PODAS (City management model with the characteristics of Public Participation, Openness, Digitalization, Accountability, Authority, and Standardization), based on the community digitization practices of Chaoyang District in Beijing and other districts. Although this model is still largely a theoretical one, it has generated some new perspectives for urban management in the context of the digital age.

Williams and Durrance described community informatics as “an emerging field focusing primarily on the interaction between local communities and information technologies . . . aimed at strengthening communities faced with the digital era and its attendant disruptions and opportunities” (2009, p. 1201). Gurstein (2003) examines the concepts and strategies underlying the notion of the digital divide and concludes that it is little more than a marketing campaign for Internet service providers. Gurstein goes on to present an alternative approach—that of “effective use”—drawn from community informatics theory which recognizes that the Internet is not simply a source of information but also a fundamental tool in the new digital economy. When it comes to the relationship between community informatics and community informatization, Stoecker (2005) develops an empowerment model for community informatization, emphasizing a community development approach combined with an information focus and a participatory process.

DiMaggio and Hargittai (2001) contend that as Internet penetration increases, researchers interested in questions about unequal access to new information technologies should focus less on the digital *divide*—the inequality between those who have access to new technologies and those who do not—and more on digital *inequality*; that is, we should not only examine differences in access but also inequality among persons with formal access to the Internet. After reviewing data on Internet penetration, DiMaggio and Hargittai (2001) describe five dimensions of digital inequality—equipment, autonomy of use, skill, social support, and purposes for which the technology is employed—that deserve additional attention. Unfortunately, there is little in the literature in the field of community informatization in China referring to the digital divide or digital equality or some theme obviously relevant to these keywords. Most articles focus on realization, main obstacles, and strategies. Some articles (Zou 邹凯 & Ma 马葛生, 2009; Liu 刘武阳, Xie 谢小良, Liu 刘登佐, & Tan 谭伟生, 2009; Wu 武建军 & Wang 王永, 2010; Wang 汪卫霞 & Wang 汪雷, 2011) in the field of community informatization evaluation put a great deal of emphasis on ICT infrastructure and ICT usage rates, but little on whether or not the information literacy of residents improved or questions of equality.

Thus, scholars have described community informatization as a concept with broad meaning—one that includes not only ICT but also community administration and service. The narrowest sense of community informatization refers to the basic community service and management information platform. Still, it is always understood that the purpose of community informatization is to consider platforms for e-government, e-commerce, and communication among community members. And while there is no doubt that we should pay attention to the infrastructure and equipment in the process of community informatization, the overriding concern for both practice and the academic sector should be whether or not commu-

nity informatization can eliminate the digital divide and information inequality.

THE CURRENT STATE OF COMMUNITY INFORMATIZATION IN CHINA

Content Based on Policy and Government Files

The development of *community* informatization in China has occurred in tandem with the deepening development of *state* informatization. The governmental push in this direction began to have an effect on the development of community informatization in the 1990s. In 1993, Jiang Zemin, the general secretary of the CPC and president of the People's Republic of China, made it clear that "none of the four modernizations in China can be realized without informatization" ("Vice Premier," 2002). Since then, this trend has only become more pronounced. In 2000, the Ministry of Civil Affairs of China launched a program of community informatization improvements in seven cities, including Beijing, Shanghai, and Tianjin.

The national policy document *National Informatization Development Strategy in 2006–2020* (General Office of the CPC Central Committee & General Office of the State Council, 2006), which supports the establishment of a national community information program, has had a deep effect on the community informatization process in China. This important document states that community informatization should

- integrate different kinds of community information systems and resources;
- develop uniform community information platforms; and
- strengthen and improve the management and use of ICT by local residents and the floating population.

Although China's Ministry of Civil Affairs had the opportunity as early as 2007 to take action on these recommendations, to date no further action has been taken—other than a call for citizens' comments on the original draft. It is true that because of China's enormous socioeconomic divides and differences across local communities, it would be difficult to apply uniform national guidelines to all local community informatization work. Large cities and provincial governments, such as Tianjin, Qingdao, Chengdu, Jiangsu, have implemented community informatization strategies tailored to their local conditions. But there is room for local governments to work in concert with the central government's informatization program; doing so would give them access to the national government's political influence and guidance.

In 2010, for instance, in order to fulfill the directives in *A National Guide to Promote Community Informatization*, nine cities in Fujian Province signed the "Smart City Informatization Strategic Cooperation Agreement" (智慧

城市信息化建设战略合作协议) with China Telecom Fujian Company. According to this agreement, China Telecom Fujian Company agreed to increase its investment in Xiamen's ICT infrastructure in an effort to promote the application of information technology to economic and social development. The Smart Xiamen project took advantage of this expanded information infrastructure to improve the level of e-government and enhance the level of local government services. In turn, Xiamen's Smart Community designated local information needs as an urgent matter and undertook a number of social management and public service projects. Residents of this Smart Community can now obtain a variety of services and perform mundane tasks, like paying their electric bills, from the comfort of their homes.

This exemplifies the state of community informatization in China. While government has been the main driver of these developments, many organizations across society have also become involved in the process. We are glad to see that more and more cities have taken up the task of community informatization.

Strategy, Process, and Best Practices

"Community informatization" encompasses a wide range of concepts including informatization practices in social affairs. Hu Jintao has emphasized the importance of building up the public information platform so as to improve the standard of living. And riding the Smart City wave, we all know informatization is crucial for intelligent social management. Many cities in China have endeavored to improve their community informatization in various ways. We will now present some examples of current conditions. Figure 1 shows the relationship between e-government and community informatization.

There is no doubt that e-government should apply to all levels of government. When it comes to a formal architecture of government in China, there are five hierarchical levels, from central government to the grass-roots subdistrict. Under Chinese law, the community committee is an autonomous organization—but in reality it is a quasi-political organization.

Although enterprises, NGOs, and individuals take part in the work of community informatization, the main driver of this work is the Chinese government. Governmental work in this area is generally divided into three steps:

- The office of the subdistrict and the community committee builds the LAN, and installs the corresponding management information system.
- Next they build a community-affairs network and an external public-services platform website.
- They connect the internal network and the wider government network.

Community Informatization in Beijing. Since the year 2000, China's capital city, Beijing, has made great efforts in community informatization.

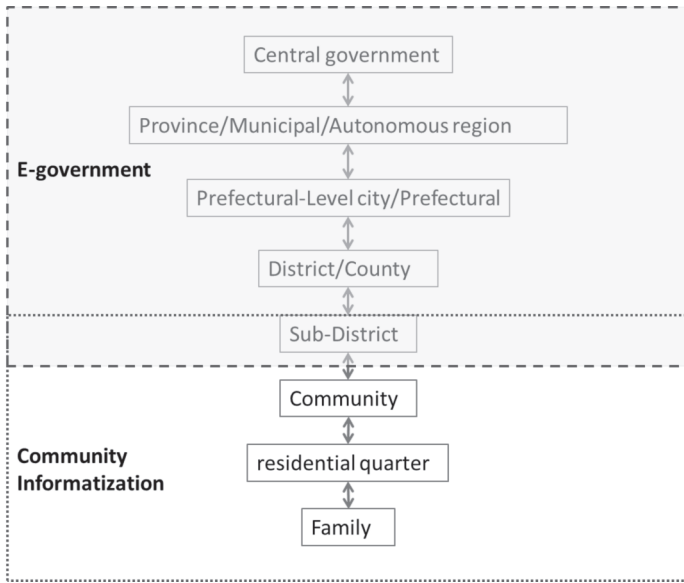


Figure 1. Relationship between E-government and community informatization.

These efforts have been organized largely around health, safety, cleanliness, culture, and service. Beijing's governmental offices have worked on several fronts to achieve these goals. First, they established a community service-information website (www.bjcs.gov.cn) and a hotline (telephone number 96156). The staff of community service centers has also worked to integrate employment, health, culture, social security, public communication, population management, and other resources under a single umbrella and have begun to use Twitter, Fetion, and QQ to meet their constituents' needs. In the future, government budgets might include a line aimed specifically at supporting long-term development of e-government (Chen 陈莽, 2011).

As a snapshot of community informatization in Beijing, consider Dongcheng District, where informatization efforts have been underway since 2007. The first step in this process was the establishment of an organizational office, which was led by the informatization departments of the local government and involved a range of community officers as well. This office then developed a set of technical and infrastructure goals (within the parameters of a pre-existing strategic plan) for Dongcheng District. Then, the district government launched 126 community informatization programs—one for each of the 126 communities in Dongcheng District—and connected them via the network. By the end of 2007, Dongcheng District had built up a unified social community network and a community

information system containing more than five hundred thousand pieces of residents' personal information—collected in an effort to tailor hotline services to community needs and support business collaboration and resource sharing. To date, the information system has registered the small but growing number of over 2,790 users. These initiatives have thus far had the effect of facilitating information collection and transmission and improving the efficiency of city management efficiency (Informatization Office of Dongcheng District in Beijing 北京市东城区信息化工作办公室, 2009).

Community Informatization in Shanghai. Shanghai has taken the lead in community informatization construction in China. The city's government proposed a local "information port" in 1994 and then launched the program two years later. By 1999 the information port program had a basic framework of over twenty information systems meant to deal with the network platform, urban planning, revenue, and governmental decisions. Between 2001 and 2005, the city shifted its attention from the upper levels to the bottom, focusing on three new areas of community informatization—the construction of community management, community services, and informatization practices within the community.

The Shanghai community service net (<http://www.962200.net>) is intended to make community services available to the public via self-service Web platforms and hotlines. When someone turns to this platform for help, questions are quickly relayed to local service providers who, with the help of community volunteers, answer the request. For instance, if somebody has a clogged pipe in his house, he can turn to the service center on the Web to find special workers to clean it out. Likewise, in the event of a planned power outage, community workers use the platform to alert local residents. The platform is basically a not-for-profit clearinghouse for information concerning everyday matters. That does not mean the repair workers will not charge for the work, but simply that the information flows freely through this platform.

Community Informatization in Guangzhou. In Guangzhou, a citizen survey office conducted an investigation into the effects of informatization on more than ten thousand households from ten districts (Yu 庾建设 & Xie 谢学宁, 2012). The data showed that the Internet access rate was 98.36 percent; 87.1 percent of the households owned computers. This was an increase of 2.2 percent from the previous year. People of different ages spent varying amounts of time on the Internet per week; but the average was close to twenty hours per week (see Figure 2). Respondents indicated that they surfed the Net for a wide range of reasons, with entertainment (music, chat), online public services, and education taking up the most time (see Figure 3).

Effects of Informatization

This survey, which was funded by China's National Science and Technology Support Program, was designed to obtain basic data about residents'

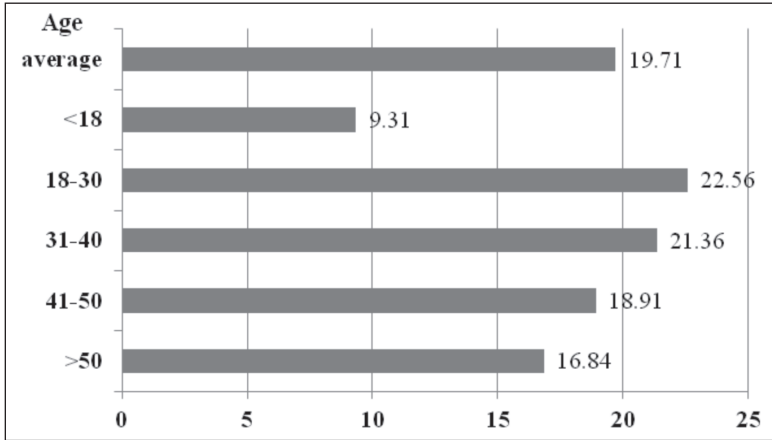


Figure 2. Net surfing time cost per week (hours). Adapted from *Annual Report on Science & Technology and Information Development of Guangdong in China* (Yu 庾建设 & Xie 谢学宁, 2012).

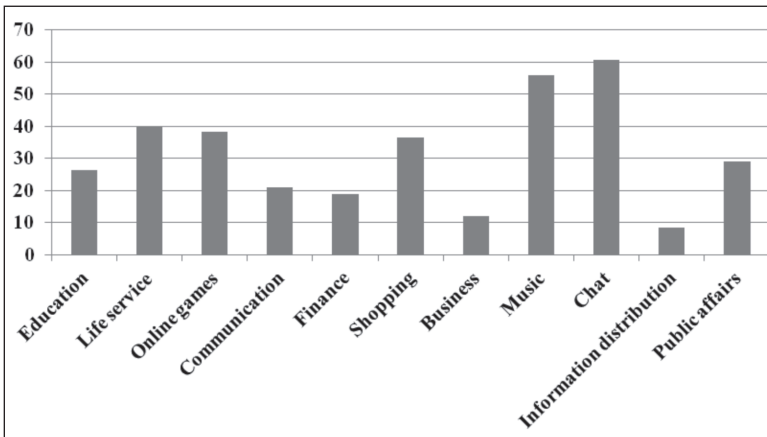


Figure 3. Net surfing purposes (%). Adapted from *Annual Report on Science & Technology and Information Development of Guangdong in China* (Yu 庾建设 & Xie 谢学宁, 2012).

opinions about community informatization. Using the PPS (probability proportionate to size sampling) method, the survey polled a sample of the population in urban communities within thirty-one provincial-level administrative units in Mainland China. According to the city data from the Ministry of Civil Affairs, PRC, we chose more samples in the administrative area where there are more communities. Student volunteers from the Information Management Department used printed questionnaires, online questionnaires, and e-mail to administer the survey. We conducted a month-long presurvey in September and October, and then immediately

started the formal survey, which ran from the end of October through November. After assessing the complexity of the undertaking, we finally decided to choose 180 communities in different cities (including municipalities, prefecture-level cities, and county-level cities) for the sample. We are currently conducting research in other types of communities.

This survey indicated that basic infrastructure distribution (see table 3) offers a substantial coverage rate; that is, 94 percent of urban communities have access to the Internet. Family-owned equipment is distributed at a similarly high rate (see table 4); 99 percent of all households, for example, reported that they own a mobile phone. These two facts—prevalence of basic infrastructure and widespread ownership of personal equipment—provide the material preconditions necessary for ICT application.

The type of service supplied by the basic infrastructure is a key factor for us to be able to describe the current status of community informatization. Based on the survey results (see table 5), we determined that the service of basic infrastructure mainly focused on daily bulletins, a lower-level service in information society. Now, we believe, the higher-level digital applications, such as self-service, should also be supported.

CHALLENGES AND COUNTERMEASURES

At the same time, great challenges and countermeasures still exist. Community informatization in China is still evolving, and there is room for improvement. Although there are more and more instances of informatization improvement at the community level, they tend to feature a low level of technological sophistication. There is still distance between informatization construction and community informatization. Obviously, the system that is being put in place is a complex one. It includes basic IT infrastructure construction—but that is not all that is required. Community informatization should facilitate residents' daily life and become an inseparable part in the process of community development.

Second, the development of community informatization relies on many factors—including sufficient human resources and funding, effective management systems, suitable IT tools, and infrastructure, all working in concert. Any of these factors may impact the pace of community informatization development. Since the chain is only as strong as its weakest link, all stakeholders must collaborate with each other to improve the local community informatization level. The government may have proper policies and funding in place; the residents may be educated enough to apply informatization tools to improve the quality of their daily life; local enterprises may be able to supply technology to support the trial of informatization; and volunteers may be ready to help make it so the rich and poor have information equity within and outside their community. But even when these pieces are all in place, there will still be a long way to go.

Third, and most important, are the actual practices. The Chinese style

Table 3. Basic Infrastructure Distribution

| Type of Infrastructure | Percent |
|----------------------------------|---------|
| Internet | 93.51 |
| Digital television lines | 72.52 |
| Electronic access control | 62.02 |
| Convenience phone | 59.54 |
| Public electronic display screen | 58.59 |
| Inquiry/charging machine | 54.01 |
| Community service call terminal | 31.68 |
| Public computer center | 28.05 |
| Other | 0.19 |

Table 4. Family-Owned Equipment Distribution

| Equipment | Percent |
|-------------------------------|---------|
| Mobile phone | 99.05 |
| Personal computer | 98.28 |
| Digital television | 86.26 |
| Landline | 74.05 |
| Tablet computer (e.g., iPad) | 51.15 |
| Family digital medical system | 10.11 |
| Other digital equipment | 0.57 |

Table 5. Service Distribution

| Service | Percent |
|--|---------|
| Mobile phone | 99.05 |
| Daily bulletin | 85.31 |
| Culture and entertainment | 63.36 |
| Public service guide (e.g., social security service) | 60.11 |
| Life information (e.g., weather, traffic, etc.) | 57.82 |
| Complaints and suggestions | 54.58 |
| Medical and health | 45.99 |
| Charging self-service (e.g., power rate, water rate, gas bill, etc.) | 45.80 |
| Inquiry self-service | 40.08 |
| Skills and training | 20.23 |
| Other | 0.57 |

tends to be more top-down. Thus, particular policies seem to be vital to initiate construction; that is, the improvement of community informatization is more likely to be successful if coordinated with local policies. As we all know, policies are more unstable than laws, and sustainability is a big concern for the long-term construction of community informatization. Another problem with the policy-oriented way of pushing forward is the difficulty of ensuring consistency between real local needs and policy direction.

Finally, historical data and information should be properly stored—in a community information database—so it can be used later. More flexible communication channels and more long-term policies, together with abundant human resources, are still in urgent need.

COMMUNITY INFORMATIZATION AND THE BRIDGING OF THE DIGITAL DIVIDE

Understanding the Digital Divide

The digital divide is a concept full of subtlety. Many terms such as the digital gap, information divide, information differentiation, digital differentiation, and digital division have similar meanings. The Organization for Economic Cooperation and Development (OECD) (2001, p. 5) defines the digital divide as “the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities.” The report identifies the most important indicators of the digital divide as being computer and Internet availability and alternative access to information through TVs or mobile phones. According to the OECD (2001), the digital divide in households depends primarily on income and education. Other variables of the digital divide—household size and type, age, gender, racial and linguistic background, and location—also play important roles.

Most of the research on the digital divide has focused on the difference between Internet “haves” and “have-nots” (Ji 纪秋发, 2010). However, some scholars have identified additional differences (Van Dijk, 2003; DiMaggio, Hargittai, Celesta, & Shafer, 2004). Recent research (Webster, 2006; Van Dijk, 2009; Hargittai, 2010) focuses on other factors that influence the digital divide, such as the imbalance of Internet use, variability of users’ capability, and how similar levels of access engage users in different ways. Cuervo and Menedez (2006) show that the multiple dimensions of the digital divide are related to ICT infrastructure and use, as well as costs, and the availability of online public service and variations in the degree of the digital divide are due to social and economic differences across countries.

The digital divide is indeed a complex issue in terms of both theory and practice. The process of informatization can be a tool to solve this problem to a certain extent but may also exacerbate it or bring some new questions to the fore. In short, the spread of community informatization raises pressing questions about the digital divide.

Survey on the Effects of Community Informatization

After conducting our presurvey in October, 2012, we revised our questionnaire and distributed the formal survey in a range of ways. Using our combined social network, we distributed questionnaires in hard copy and

through email and conducted online interviews. A total of 769 questionnaires were distributed in thirty-one province-level administrative regions (municipalities,² provinces, and autonomous regions) in mainland China from October to November, 631 of which were returned, with 524 being effective and the effectiveness rate being 68.1 percent. The basic data from the effective questionnaires is presented in table 6 below. (For opinions on effects of community informatization, see table 7.)

According to our survey, nearly 55 percent of residents believe that community informatization has made things more convenient; 45 percent believe that community informatization has had little effect on their daily lives. Most of residents surveyed (81 percent) believe that they can benefit from an improvement in their information literacy; 5 percent of them think they have already seen a notable improvement in this area due to community informatization; and 19 percent think they have seen little or no improvement. When it comes to the overall change as a result of the implementation of community informatization, people are optimistic: more than 52 percent of residents expressed obvious appreciation and believe informatization has brought or will bring more tangible benefits to residents. Only 4 percent think it is of no value and claim that it is nothing but a vanity project.

Table 6. Basic Data From the Survey Sample

| Question | Option | Percent |
|---|---|--------------|
| Gender | Male | 45.04 |
| | Female | 54.96 |
| Age (y) | ≤18 | 0.38 |
| | 19–30 | 59.16 |
| | 31–49 | 38.93 |
| | 50–65 | 1.53 |
| Education | Junior middle school and below | 0.38 |
| | Senior middle school/secondary specialized school | 7.06 |
| | Bachelor's degree | 82.44 |
| | Postgraduate degree | 10.11 |
| Income (yuan) | ≤800 | 0.57 |
| | 800–2000 | 6.87 |
| | 2001–3000 | 11.64 |
| | 3001–5000 | 30.73 |
| | ≥5000 | 50.19 |
| Years at current residence | ≤0.5 | 1.91 |
| | 0.5–1 | 3.44 |
| | 1–3 | 19.66 |
| | 3–5 | 22.14 |
| | ≥5 | 52.86 |
| | City | Municipality |
| Provincial capital/vice-provincial city | | 37.98 |
| Prefecture-level city | | 22.33 |
| County-level city | | 7.44 |
| Town | | 2.67 |

Table 7. Opinions of Community Residents

| Questions | Opinions | Percent |
|---|----------------|---------|
| What would you like to describe the convenience brought by community informatization infrastructures and service? | Extremely | 6.11 |
| | A lot | 49.05 |
| | General | 40.46 |
| | Not much | 3.63 |
| | Little or none | 0.76 |
| What would you like to describe your literacy and skills improvement in community informatization? | Extremely | 5.15 |
| | A lot | 26.53 |
| | General | 49.24 |
| | Not much | 14.89 |
| | Little or none | 4.20 |
| What would you like to describe the overall change in community informatization? | Extremely | 8.21 |
| | A lot | 43.32 |
| | General | 36.83 |
| | Not much | 7.25 |
| | Little or none | 4.39 |

Though the benefits that community informatization brings to residents are obvious, there are still some areas with room for improvement. Areas that could use improvement include infrastructure operation and maintenance, skills training, and attention to vulnerable groups. When asked about the factors contributing to the uneven distribution of benefits from community informatization, survey respondents mainly pointed to the following four reasons: 1) lack of relevant supporting material (57.25 percent); 2) lack of relevant skills (50.38 percent); 3) difficulties in clearly expressing requirements of information (41.60 percent); and 4) lack of information consciousness (41.41 percent). Information consciousness here means a sort of information literacy that someone would be sensitive to new information and be eager to obtain some information or knowledge. In short, survey participants believe that the effects of community informatization are not shaped entirely by infrastructure.

The question of what people think about the difficulty of accessing the information infrastructure and information services is a topic that requires more scholarly attention. Williams (2012) calls this an “informatics moment,” and points out that right now is indeed a very important moment for the improvement of information literacy. According to our survey, most residents (35.5 percent) prefer to resolve their difficulties with the infrastructure by themselves, or, as an alternative, ask administration faculty to ask a professional for help. Lack of information literacy has been the key factor in maintaining the digital divide.

Training also becomes an important tool for addressing the digital divide. Relevant data collected about training is presented in table 8. There is room for improvement in this area. It is worth noting that, according to survey results, residents who are optimistic about their own information literacy tend to be participating more actively in training. Thus, a willing-

ness to learn new technological skills may be another important variable in the study of the digital divide.

Other strategies, beyond training, that might help narrow the digital divide also attracted much attention from the survey participants. These strategies include

- reducing the cost of home installation of infrastructure;
- offering easy access to specialized information terminals (such as “push-to-talk” for the elderly);
- a regular, targeted-training tracking service; and
- improving the human-computer interaction interface.

Community informatization has done much to narrow the digital divide and has enabled a great many individuals to benefit from the process of community informatization. However, because the nature of the digital divide itself is always evolving, scholars need to address an ever-changing number of factors in their studies of community informatization.

CONCLUSION

Community informatization projects have done much to bridge the digital divide in contemporary China. These projects have demonstrated that community informatization has a potential similar to that of community informatics projects in other countries. The two CIs, community informatics and community informatization, may come to be united through the goal of promoting digital equity.

The advance of community informatization in contemporary China has been made possible by governmental efforts, as the social collaboration among different nongovernmental sectors has not matured yet. Community informatization in China has brought opportunities to ordinary citizens. Even people who have not mastered the skills associated with

Table 8. Training in Community Informatization

| Questions | Opinions | Percent |
|--|-------------------------------|---------|
| What is the frequency of training and instruction in this community? | Sometimes | 57.44 |
| | Never | 28.05 |
| | Unclear | 7.82 |
| | Often | 6.68 |
| Who is/are the executor(s) who has/have ever carried out training in this community? | Property service company | 64.58 |
| | Community committee | 52.08 |
| | Volunteer organization | 51.79 |
| | Residents | 29.46 |
| | Local library | 25.6 |
| What has/have been covered in the training? | Equipment supplier | 18.15 |
| | Special service introduction | 59.82 |
| | Service for vulnerable groups | 50.3 |
| | Self-service instruction | 48.51 |
| | Computer/Internet use | 36.01 |

ICT can still enjoy the fruits of community informatization—since one need not possess professional skills to take advantage of its benefits. For instance, an automatic-access control system or an induction lighting system needs no special knowledge or operational skills. Community informatization has made its influence felt in the everyday lives of people and has not widened the digital divide.

Community informatization in China can be considered an extension of e-government and e-commerce. Generally speaking, the current Chinese urban community—*she qu*—is a concept full of distinct historical and cultural features, and mainly takes three forms:

- Communities with a high degree of modernization populated by residents with similar economic and social status and high integration within a general social network
- Traditional communities, similar to the ones that were organized by state-owned enterprises in the past, which bring together residents who have worked or are working in the same organization
- Urban village-communities—or, communities that resulted from urbanization but have not yet transformed into urban communities in the true sense; in such communities there is often a marked culture clash between the community's original inhabitants and migrants

Community informatics focuses on social groups and on institutions that impact the collective experience in a community. The core tenets of community informatics, such as the focus on participatory process and attention to the “informatics moment,” have been widely adopted in the construction of community informatization.

The research on community informatization in China has been largely preoccupied with the political background and practical advances of the work. This body of scholarship should, however, begin to borrow ideas from the community informatics perspective. Important features of the community informatics perspective could help proponents of community informatization more efficiently deploy resources. In turn, the field of community informatics would be nourished by considering the ideas developed by the practitioners of community informatization. Fortunately, there are now more pioneers introducing community informatics in LIS education in China—for instance, at the Summer School of Community Informatics at Peking University and in related courses in the undergraduate curriculum at Nankai University. We believe the fusion of community informatics and community informatization will be very fruitful.

The authors were very scrupulous in the survey and data collection process. However, due to the complex character of contemporary Chinese communities and the dispersion of questionnaire distribution, there were some areas of risk, such as sample representation and data authenticity. Further verification shall be done in order to continue this study.

In addition, at present, community informatization achievements in China are still mainly concentrated in the urban areas. Describing the process of ICT dissemination and diffusion in the vast rural areas will be a challenging and meaningful task. If community informatization perspectives remain open, then community informatics has broad prospects for development in China.

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NOTES

1. CNKI (China National Knowledge Infrastructure), one of the largest online database publishers in China, was founded in 1999 by Tsinghua University and Tsinghua Tongfang Company. It has a large collection of Chinese research papers from journals, proceedings, statistics, standards, patents, and other academic publications.
2. A municipality is a kind of special administrative region and always has significant meaning to the nation. There are four province-level municipalities in China, Beijing, Shanghai, Tianjin and Chongqing.

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