
The Top-Down Approach to Providing ICT Access to Rural Communities in China: Opportunities for Community Informatics

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ABSTRACT

Community informatics (CI)—as practiced by Western academics and social activists—was introduced to China by a group of library and information science scholars in about 2010. But before this encounter, there was already a growing push in China to connect local communities with information communication technologies (ICTs). This work is generally known in China as community or rural “informatization.” Although the new, Western-origin community informatics efforts did not completely overlook existing Chinese endeavors, they have so far done little to relate to ongoing domestic projects. This article attempts to place community informatics in relation to Chinese rural informatization programs in general, and to public access projects in particular. In the process, it examines the opportunities and challenges facing the newly imported community informatics projects. It shows that while CI brings a new perspective to Chinese endeavors, it faces a very different political, institutional, and social environment from what it has known before—one which favors a top-down approach to providing community-based ICT. This calls for prudent assessment of the relationship between CI and both rural communities and government-led projects.

INTRODUCTION

If we define community informatics (CI) broadly as a discipline concerned with the application of information and communication technology (ICT) to community development (Gurstein, 2000, p. 1; Gurstein, 2007, p. 11), then we can say that CI emerged in China toward the end of the last century in the form of “informatization.” The term *community informatization* 社区信息化 is usually used to describe efforts to apply ICT in urban communities, while the term *rural informatization* 农村信息化 refers to ICT ap-

plication in the countryside, either in a narrower sense of ICT application in rural community life or in the broader sense of ICT application to agricultural activities *and* rural community life (Li, 2009, p. 12). The profile of the discipline rose significantly after 2004–2005, when the state launched its strategic plans to build a harmonious society and a new socialist countryside. These plans were proposed at the 4th and 5th plenary sessions of the 16th CPC Central Committee in 2004 and 2005, respectively, and enacted in the Decision of the CPC Central Committee on Building a Socialist Harmonious Society 中共中央关于构建社会主义和谐社会若干重大问题的决定 and the Proposal of the CPC Central Committee and the State Council for Promoting the Development of the Socialist New Countryside 中共中央 国务院关于推进社会主义新农村建设的若干意见. Informatization was understood to hold an important place in these initiatives, and projects to apply ICT in both urban and rural communities multiplied in their wake. Meanwhile, related research activities—organized under the discourses of “community informatization” and “rural informatization”—flourished. A cursory search in the title field of the CNKI database (a full-text electronic database for the Chinese academic community) using “rural informatization” returned 1,164 journal articles published between 2000 and 2012; a search using “community informatization” returned 171. Research topics ranged from ICT applications to different aspects of life (e.g., democratic participation, home-based care of the elderly, and health care), to the delivery of e-commerce and e-government, to the design of digital communities.

Notwithstanding this rapid growth in both practical and research activities, the concept of community informatics as understood in Western countries was not widely known until very recently. In 2010, Yan (Nankai University) published the first article in Chinese on community informatics, which was followed in 2011 by an article by Hu (Yunnan University) on the research and teaching activities of community informatics in Western universities and another by Hu in 2012 on the research methods of community informatics. In the meantime, two summer schools (one in 2011 and the other in 2012) at the Department of Information Management of Peking University and related publications (Williams, Han, Yan, & Alkalimat, 2012) broadened awareness of community informatics in China. In adopting the discourse of “community informatics” and presenting the Western approach of marrying community development and ICT, these publications have brought substantially new perspectives to China. Among these are a focus on the community vis-à-vis the state and individuals; emphasis on the embeddedness of ICT in community life and social networks; commitment to equal and universal access to ICT; belief in the role of public computing facilities in bridging the digital divide; espousal of the bottom-up approach in implementing community-based ICT projects; optimism about the potential of ICT to revitalize deprived communities that are

marginalized by the networked society; and a critical stance toward the nonneutrality of technologies in relation to power distribution (Alkalimat & Williams, 2012; Gurstein, 2003, 2007; McIver, 2003; Simpson, 2005; Williams & Durrance, 2008, 2012).

But to date, little has been done to relate the newly introduced perspectives of community informatics to the ongoing Chinese efforts of applying ICT in communities. This essay attempts to begin filling this gap by placing community informatics in relationship to Chinese rural informatization programs in general, and public access projects in particular. The authors of this article chose to focus on both the rural setting and “public access” for two reasons. First, during the past ten years, Chinese government departments and agencies have launched a great number of projects to establish public ICT access in rural areas (Qiang, Bhavnani, Hanna, Kimura, & Sudan, 2009). These include the National Cultural Information Resource Sharing Project 全国文化信息资源共享工程, the Nationwide Modern Distance Education of Rural Cadres Project 全国农村党员干部现代远程教育, and the Rural Comprehensive Information Service Station initiatives 农村综合信息服务站, among many others. These projects have increased ICT access in rural China, making the countryside a fertile site for community-based ICT applications. Second, despite their shared interest with Western community informatics in community-based ICT, these projects are in fact very different from those that Western community informatics would espouse. Developed through centrally controlled planning processes and administered through the bureaucratic structure of the state, they are top-down rather than bottom-up, government administered rather than autonomously managed, and driven by national development agendas rather than community needs. These differences serve as important reference points for community informatics in China.

Thus this study examines the rationale for and characteristics of this top-down approach in the context of community informatics discourse. In doing so, the authors address the following questions:

- How were major projects of the tenth and eleventh five-year planning periods (2001–2010) implemented, and how did they enable public access to ICT in rural communities?
- How did the top-down approach shape ICT provision at the community level?
- What opportunities do the resulting community-based ICTs present for emerging community informatics in China?

Given the fact that a number of major projects aimed at full coverage of all villages (i.e., one public access point in every village), the implications for community informatics cannot be overestimated. These questions are therefore of great significance to the future of community informatics in China. Additionally, since community-based projects in other countries

also encounter tensions between top-down and bottom-up approaches (Simpson, 2005; Williams, 2007), this investigation may generate useful lessons of broader relevance.

RESEARCH METHODS

In an attempt to address the questions mentioned above, the authors of this article conducted a series of document analyses and field investigations into three rural community-based public access projects: the National Cultural Information Resource Sharing Project, administered by the Ministry of Culture 文化部; the Nationwide Modern Distance Education of Rural Cadres Project, administered by the Organization Department of the Central Committee of the Communist Party of China (CPC) 中共中央组织部; and the Rural Comprehensive Information Service Station initiative, led by the Ministry of Industry and Information Technology 工业与信息化部.

Document analysis centered on the first two projects. For each project, we searched for and downloaded planning documents issued by the central government and seven provincial governments (two from each of the Eastern, Central, and Western regions, one from the Northeastern region). We then conducted a central vs. provincial comparative analysis. Then we searched for and downloaded planning documents issued by county-level governments within the seven provinces. We compared these with both the central government documents and provincial government documents. This last step only returned two county-level documents for the National Cultural Information Resource Sharing Project and three for the Nationwide Modern Distance Education of Rural Cadres Project. All told, twenty-four planning documents for the National Cultural Information Resource Sharing Project and fourteen for the Nationwide Modern Distance Education of Rural Cadres Project were analyzed comparatively. We looked specifically for information about decisions regarding the project goal, source of funds, size of funds, choices of technologies, selection of information resources, etc. The Rural Comprehensive Information Service Station initiative has not yet created enough policy documents from different levels of government to support a comparative analysis. For the analysis of this project, two central government documents were examined but were not compared with any local government documents. The number of documents analyzed for each project is shown in table 1.

In addition, field investigations were carried out. In these investigations, we examined the implementation of the three projects from the top to the bottom. We traced projects from the central government (which planned the projects) to the provincial, city, and county governments (which executed the projects) to townships and villages (which provided public access points to the projects). How, we wondered, did this process shape ICT provision at the rural community (township and village) level? Our investigation focused mainly on the access to technology (computers,

Table 1. Number of Policy Documents Analyzed for Each Project

| Projects | No. of Central Government Documents | No. of Provincial Government Documents | No. of County Government Documents | Total |
|--|--|---|---|-------|
| National Cultural Information Resource Sharing Project | 6 | 16 | 2 | 24 |
| Nationwide Modern Distance Education of Rural Cadres Project | 2 | 9 | 3 | 14 |
| Rural Comprehensive Information Service Station initiative | 2 | 0 | 0 | 2 |

the Internet, IPTV, etc.), information resources, and services offered by these programs. We interviewed local government officials and professionals responsible for implementing the projects in five to six communities in each of three areas were visited.

Data was coded and categorized according to the framework in figure 1. Data from the first part of the study (document analysis) was further analyzed in light of the political economy of recent national development, aiming to show how rural informatization projects in general and these three projects in particular were prioritized by the national development agenda. Data from the second part of the study (field investigation) was further analyzed from the perspective of community informatics, aiming to show how the resulting ICT was related to the development need and characteristics of local communities. In the end, we believe that opportunities and challenges faced by the newly introduced perspectives of community informatics can only be understood in light of both of these analyses.

NATIONAL INFORMATIZATION, CHINESE INFORMATION SOCIETY, AND RURAL INFORMATIZATION PROJECTS

During the 1970s, it was said that the Western world reached the stage of a postindustrial or information society. It did not take Chinese leadership very long to realize what this meant. Aiming to catch up with the developed Western countries that China had fallen behind during the industrial age, the Chinese government launched a series of initiatives to build a domestic engine for a Chinese information society. In 1979, the State Council established the National Bureau for Computing Industry 国家电子计算机工业总局 under its direct jurisdiction. That was followed by the establishment of the Steering Group for Computers and Large Scale Integrated Circuits 电子计算机和大规模集成电路领导小组 in 1982 (renamed the Steering Group for Electronic Promotion 电子振兴领导小组 in 1984). This renamed steering group soon published *The Strategic Development Plan*

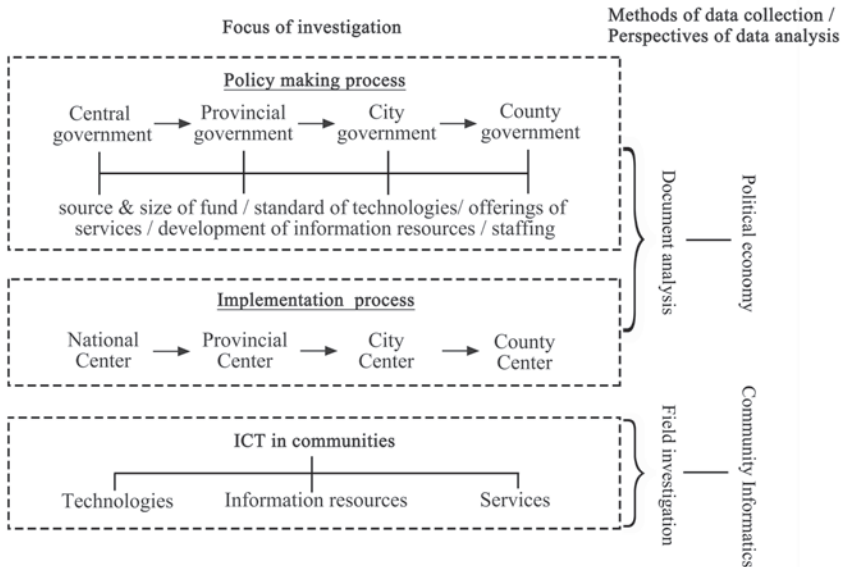


Figure 1. Framework for data collection and analysis.

for the Electronic and Information Industry in China 我国电子和信息产业发展战略, in which computer and communication technologies were given salient priority. In 1986, China launched its massive 863 Program to promote the nation’s competitiveness in leading-edge science and technology areas. Around two-thirds of the 863 Program’s funding was devoted to IT-related areas (Zhou, 2009, p. 46).

This emphasis on information technology paved the way for the envisioning of national informatization in the early 1990s—which in turn paved way for the launch of a series of informatization projects called the Golden Projects. The first three were the Golden Bridge 金桥, Golden Card 金卡, and Golden Custom 金关; together they informatized national economic data transfers, finance, and international trade. In 1995, Prime Minister Li Peng delivered a speech at the National Science and Technology Congress 全国科技大会 calling for wider application of ICT to further promote the informatization of the national economy. In 1996, the State Council’s Steering Group for Informatization 国务院信息化领导小组 was established, and, in 1997, the first National Working Meeting on Informatization 全国信息化工作会议 was held. In 2000 a national development strategy that combined industrialization with informatization—a strategy that aimed at fueling industrialization with informatization—was enshrined in the *Proposal of the CPC Central Committee for the Tenth Five-Year Plan for National Economic and Social Development* 中共中央关于制定国民经济和社会发展第十个五年计划的建议. Responding to the intensifying call for the

informatization of economy and society and inspired by the achievement of the first Golden Projects, ministries responsible for different areas of economic and social development proposed and implemented a great many additional informatization projects during the tenth and eleventh five-year planning periods (some of which continued into the twelfth period).

While ICT-driven development strategies did fuel the growth of the economy, economic restructuring also led to a significant redistribution of resources and interests. This, in turn, led to increasing socioeconomic gaps. Rural areas, which already lagged far behind urban areas in terms of per capita income, public infrastructure, and public services, were further disadvantaged. The ratio of urban residents' per capita income to that of rural residents, for instance, widened from 2.2:1 in 1990 to 3.2:1 in 2005 (Ministry of Agriculture of China, 2006, p. 110). By the end of the 1990s, rural development problems were so pronounced that they began to be widely discussed as the triple issues of agriculture, peasants, and rural communities 三农问题.

In order to address these mounting problems, the CPC Central Committee and the State Council once again devoted their No.1 policy document of the year to rural development issues in 2004. This was followed by nine more consecutive No.1 documents on rural development from 2005 to 2013. Along with this long list of No.1 documents were two key decisions of the CPC—the decision of the 5th plenary session of the 16th CPC Central Committee in 2005 to build up the Socialist New Countryside, and the decision of the 3rd plenary session of the 17th CPC Central Committee in 2008 to push forward new rural reform programs—as well as two national economic and social development plans and a large number of agriculture-and-related-sector plans.

Ever since the publication of the 2005 No. 1 document, the government has consistently emphasized the importance of rural informatization. It has come to be viewed as a multifaceted solution to problems in rural China's information infrastructure, as well as its information provision, social management, public services, education, culture, and production. In this way, rural informatization has come to be seen as the key to modern agriculture and rural society. According to one trade magazine, it

not only increases the productivity of resources, but also productivity of labor. Spanning every area and phase of agricultural production, business, management, and services, modern information technology is the foundation of modern agriculture. It is upon informatization that the following missions can be fulfilled: to build the new countryside; to connect urban and rural residents, urban and rural areas, and industry and agriculture; to facilitate rational deployment and two way flows of production elements, economic elements, and life elements between cities and agriculture; and to bridge the digital divide. ("Great Potential," 2012, pp. 4–5.)

Seen in the context of national development, it is clear that rural informatization has been driven by both the national development strategies (i.e., to propel industrialization through informatization) and the urgent need to resolve the rising rural crisis. During the tenth and eleventh five-year planning periods, the government launched a series of programs to promote rural informatization. A recent working paper by the World Bank shows that during the tenth and eleventh five-year planning periods, no fewer than fifteen projects led by eleven central government ministries and agencies were implemented (Qiang et al., 2009). These include programs to extend broadcasting and telecommunication infrastructure to all villages; programs to develop and integrate information resources; programs to apply information technologies to agricultural production, business (e-commerce), and government (e-government); and programs to develop information services for rural communities. As a result of these informatization programs, the information infrastructure in rural China has improved significantly. By the end of 2010, 100 percent of administrative villages had access to telephone (National Bureau of Statistics of China, 2012, p. 158), and 80.11 percent had a broadband network connection (National Bureau of Statistics of China, 2011, chap. 16). The number of computers per hundred rural households reached 18 in 2011, a marked increase from 0.5 per hundred households in 2000 (National Bureau of Statistics of China, 2012, p. 102).

A number of rural informatization projects have focused on providing local communities with public ICT access points. In comparison with other projects (e.g., those applying ICT to different stages of agricultural production), these projects more explicitly take the whole community as the object for empowerment and are therefore of particular interest to community informatics. It is to these projects that the current paper will now turn.

THE TOP-DOWN PROCESS OF PROVIDING ICT ACCESS IN RURAL COMMUNITIES: THREE NATIONAL PROJECTS

As mentioned earlier, since 2001 (the beginning of the tenth five-year planning period), a variety of central government ministries/agencies and provincial governments have implemented a large number of projects meant to provide rural communities with public access to ICT (Qiang et al., 2009; Li, 2009). This section and the next take three such projects as examples, examining in detail how they were implemented from the top to the bottom—and how this process has shaped each project at the community level.

National Cultural Information Resource Sharing Project

The National Cultural Information Resource Sharing Project (Cultural Sharing Project henceforth) officially started in April 2002 during the

tenth five-year planning period and continued in the eleventh and twelfth. The aim of the project was to utilize modern information technology to create a shared repository of digital Chinese cultural resources and disseminate them to the whole nation through tools such as the Internet, satellite networks, mobile storage facilities, mirror sites, compact discs, and cable/digital television networks. Part of the project was to establish public access points throughout the country. A typical village access point was equipped with either a networked computer or IPTV or mobile storage plus a film projector. It is through the establishment of these public access points that the Cultural Sharing Project became an agent of community-based ICT provision. Having established public access points in 22,963 townships (67 percent of all townships) and 597,000 villages (98 percent of all administrative villages) by 2010 (*Introduction to*, n.d), the project began to expand the capacity of existing access points and new ones by increasing the number of networked computers and upgrading their hardware and software. This new phase of the project is called the “public electronic reading rooms program” 公共电子阅览室建设计划 and is scheduled to finish by 2015 (the end of the twelfth five-year planning period).

From the very beginning, the Cultural Sharing Project had two related tasks: content creation/integration and the provision of community-based public-access facilities throughout the country. To ensure that both tasks achieve their targets within the planned time span, the Ministry of Culture has issued no fewer than fifteen key policy documents concerning the administrative and operational frameworks of the project. In accordance with these frameworks, complex administrative and executive structures were established from the top to the bottom. Within the central government, a national steering group led by the Ministry of Culture and joined by other related ministries was established to plan and oversee the nationwide implementation of the project. The 2002 document *Notification on Implementing the National Cultural Information Resource Sharing Project* 关于实施全国文化信息资源共享工程的通知, issued jointly by the Ministry of Culture and the Ministry of Finance, required that each provincial and city/county government establish a corresponding body to plan and oversee the implementation of the project within its own jurisdiction. In the meantime, national and local centers were established as the executive arm of the project, responsible for creating and/or integrating cultural resources, implementing technologies, setting up public access points, and overseeing the operation of these access points. By the end of 2011, the project had established 1 national center, 33 provincial centers, and 2,840 county centers (Social Culture Division of the Ministry of Culture, 2012). This structure is shown in figure 2.

Project expenditures have been shared by the central and local governments according to the ratio set by the central government. Information resources have been developed primarily by the national and provincial

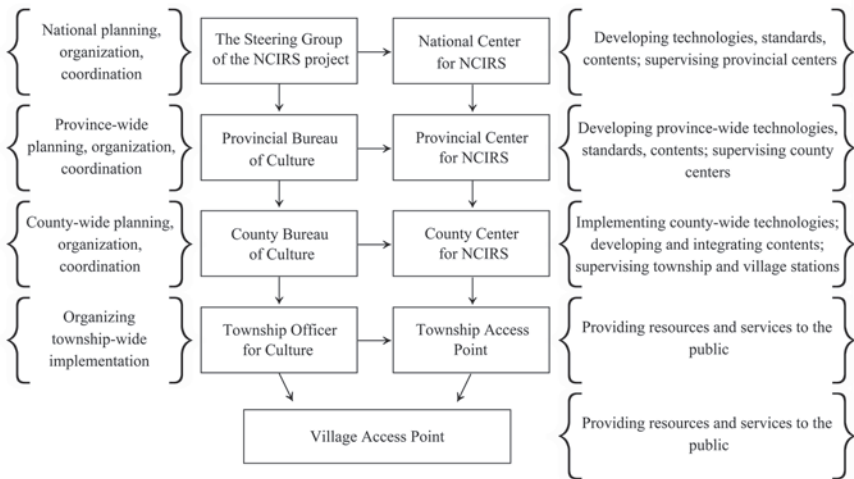


Figure 2. Organizational structure for the National Cultural Information Resource Sharing (NCIRS) Project.

centers, with some contribution from the county centers. Decisions regarding nearly all administrative and operational aspects of all levels of the centers and access points (e.g., source and size of funds, choice and standards of technologies, assessment of implementation progress, collaboration with other projects, resources and services provided, staffing) are made by the central government and are largely reiterated by provincial and county governments. Very few provincial and county governments have issued more specific policies by either covering more aspects of the project centers/access points or providing more detailed instructions in relation to these aspects on the basis of central government policies. Township governments and villages are largely outside the hierarchy of decision making but are responsible for maintaining local public access points. Table 2 shows the amount of funds, centers/access points, and information resources of the project; table 3 shows the decision-making structure concerning major issues related to the project centers and access points.

Nationwide Modern Distance Education of Rural Cadres Project

The Nationwide Modern Distance Education of Rural Cadres Project (Distance Education Project henceforth) was first launched in 2003 as a pilot project by the Organization Department of the Central Committee of the Communist Party of China (CCCPC) to explore ways of delivering quality educational and information resources to rural cadres using modern information and communication technologies. The first phase of the pilot project was conducted between 2003 and 2004 in three provinces (Shandong, Hunan, and Guizhou) and was extended to nine more provinces in 2005. Based on the technological, administrative, and operational models

Table 2. Amount of Funds, Centers/Access Points Established, and Information Resources Developed by the National Cultural Information Resource Sharing Project (2002–2011)

| Funds (RMB, billions) | | No. and Coverage* of Project Centers and Access Points | | Resources Developed | |
|--|-------|--|----------------|--|--------|
| Fiscal input from the central government | 3.064 | No. of national centers established | 1 | Total amount (TB) | 136.4 |
| Fiscal input from local governments | 3.712 | No. and coverage of provincial centers | 33 100% | Audiovisual resources (items) | 34,809 |
| | | No. and coverage of county centers | 2,840 99% | Audiovisual resources (hours) | 21,964 |
| | | No. and coverage of township access points | 28,595 83% | Resources in ethnic minority languages (hours) | 1,956 |
| | | No. and coverage of village access points | 602,000 99% | No. of local culture databases | 207 |

* Coverage refers to the percentage of administrative units at each level having a project center/access point out of the total number of administrative units at the corresponding level.

Source: Social Culture Division of the Ministry of Culture (2012).

established during the pilot stage, the project was rolled out on a national scale in 2007. In a 2007 directive of the CCCPC, *Proposal for Implementing Nationwide Modern Distance Education of Rural Cadres* 关于在全国农村开展党员干部现代远程教育工作的意见, the project was conceptualized as a means to bring prosperity to peasants, to help build up the socialist new countryside, and to consolidate the foundation of CPC rule in rural China.

Like the Cultural Sharing project, the Distance Education project was also charged with the multiple tasks of resource and technological development, and local access provision. In terms of resource development, it was decided that distributed resources for the project would be developed collaboratively by the Organization Departments of the Central and local committees of the CPC, and would include both originally created resources and resources produced by the party schools and a variety of other institutions (e.g., educational, legislative, social security, agricultural, cultural, public health, family planning, film and broadcasting, publishing, and research institutions). It was also decided that the content of these resources would focus on party and government policies, laws and regulations, ethics, science and technology, culture, and technical skills. With regard to technological infrastructure, it was decided that a distributed platform would be built, also collaboratively by the Organization Departments of the Central and local committees of the CPC, which would be

Table 3. Number of Local Governments That Issued Reiterating, More Specific, or Less Specific Policies in Comparison With Central Government Policies Regarding Local Centers and Access Points of the National Cultural Information Resource Sharing Project

| Local Centers or Access Points | Roles | | | Criteria of Technology | | | Source and Size of Funds | | | Content Development | | | Service Provision | | | Staffing | | |
|--------------------------------|---------------------|----|----|------------------------|----|----|--------------------------|----|----|---------------------|----|----|-------------------|----|----|----------|----|----|
| | R | MS | LS | R | MS | LS | R | MS | LS | R | MS | LS | R | MS | LS | R | MS | LS |
| | Provincial centers* | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| City/county centers | 7 | 0 | 2 | 5 | 0 | 4 | 7 | 1 | 1 | 5 | 2 | 2 | 2 | 0 | 7 | 2 | 1 | 6 |
| Town/village access points | 5 | 0 | 4 | 6 | 0 | 3 | 8 | 0 | 1 | NA | NA | 2 | 2 | 0 | 7 | 2 | 1 | 6 |

Note: * Policies issued by 7 provincial governments and 2 county governments were analyzed. Only provincial governments have policies regarding provincial centers; R = reiterating, MS = more specific, LS = less specific.

able to disseminate resources through various technologies (e.g., satellite, the Internet, cable TV) and support teaching, learning, and reference functions. For local access provision, it was decided that each village would have a public access point. In the aforementioned 2007 document issued by the General Office of the Central Committee of the CPC, instructions regarding the establishment of village access points specified that (1) public access points should be in place in all administrative villages by 2010; (2) wherever possible, a village's Distance Education access point should utilize distance-learning facilities in primary and secondary schools; and (3) where joint use of distance-learning facilities was not possible, the local government should provide funds to establish dedicated Distance Education access points. Public access points could use satellite, cable TV, or broadband telecommunication networks to receive Distance Education materials, depending on local conditions and circumstances. Therefore, a minimally equipped access point would have an Internet connection, a TV set, a set-top box, and a projector; an extended 扩展型 access point would have all these facilities plus one or more computers. Such an access point was expected to function as a training site for rural cadres, an activity site for rural organizations, a pilot site for rural informatization, an economic site helping peasants increase their income, a learning site for migrant workers to gain vocational skills, and an entertainment site for enriching the leisure time of villagers (General Office of the Central Committee of the CPC, 2007).

To ensure the accomplishment of these tasks, the project established an organizational structure very similar to that for the Cultural Sharing project: it was administered by the Organization Departments of the Central and local committees of the CPC and implemented by the national and local modern distance-education centers (offices), and its resources and services were accessed through township and village public access points. Table 4 summarizes information on the funding, access points, and resource development of the project; table 5 shows the decision-making structure concerning major issues related to the project centers and access points.

Rural Comprehensive Information Service Stations

Prior to the Cultural Sharing and the Distance Education projects, there already existed various forms of public ICT access venues in some parts of rural China, where basic ICT (computers with Internet connections) and rudimentary assistance were provided. Known as "rural information service stations" 农村信息服务站 or "rural comprehensive information service stations" 农村综合信息服务站, these venues were established by various players for different purposes. Some were built by government agencies as pilot projects for rural informatization, some by telecommunication service providers as experience centers 体验中心; some by non-

Table 4. Amount of Funds, Local Access Points Established, and Information Resources Developed by the Nationwide Modern Distance Education of Rural Cadres Project (2003–2011)

| Funds for Infrastructure* (RMB, billions) | | | |
|---|------------------------|--------------------------------|----------------------------------|
| From Central Government | From Local Governments | Township/Village Access Points | Teaching Resources Developed** |
| 1.274 | 3.956 | Over 700,000 | 8854 hours of teaching materials |

* Funding for operational costs is not precisely known. The total amount of funds for the project from 2003 to 2011 is estimated at around 10 billion RMB.

** The project also provides nonteaching materials through its central and local platforms (e.g., news, policies, and reference materials); the amount of this information is not known.

Source: The Central Government Website (2012). Overview of the progress of the Modern Distance Education of Rural Cadres Project. 中央政府网站 (2012). 全国农村党员干部现代远程教育网络建设工作综述. http://www.gov.cn/jrzq/2012-10/15/content_2244057.htm.

governmental organizations in accordance with their general missions; and some were joint ventures by different stakeholders with a variety of purposes.

In 2009, the Ministry of Industry and Information Technology (MII), the administrative and regulatory body for industry and information, began trying to regulate the establishment of rural information service stations. It promulgated *The Basic Regulations for the Construction and Services of Rural Comprehensive Information Service Stations (Provisional)* 农村综合信息服务站建设和服务基本规范(试行) and required that local departments of information technologies regulate the development of rural comprehensive information service stations in accordance with the framework set forth by the document. The document defines the rural comprehensive information service station as an integrative part of the rural information infrastructure and sees it as an important means for balancing urban and rural development and for bridging the digital divide. The document further requires that a station should meet five basic criteria of having a stable venue, a collection of ICT equipment, an information officer, a set of management regulations, and a long-term development mechanism. With regard to equipment, it requires at minimum one computer, one telephone, and an Internet connection. The station is expected to provide local residents with access to general Internet information, agricultural science and technology information, market information, educational information, and medical and health care information, as well as information resources developed by the Cultural Sharing and the Distance Education projects; it is also expected to provide basic services such as training, consultation, and assisted information search. In addition, it is also allowed to engage in fee-based services such as e-commerce, retailing of production materials, and proxy payment of bills.

Table 5. Number of Local CPC Committees That Issued Reiterating, More Specific, or Less Specific Policies in Comparison With Central Policies Regarding Local Centers and Access Points of the Nationwide Modern Distance Education of Rural Cadres Project

| Local Centers or Access Points | Roles | | | Criteria of Technology | | | Source and Size of Funds | | | Content Development | | | Service Provision | | | Staffing | | | |
|--------------------------------|---------------------|----|----|------------------------|----|----|--------------------------|----|----|---------------------|----|----|-------------------|----|----|----------|----|----|---|
| | R | MS | LS | R | MS | LS | R | MS | LS | R | MS | LS | R | MS | LS | R | MS | LS | |
| | Provincial centers* | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 7 | 1 | 0 |
| City/County centers | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 7 | 0 | 3 | 0 | 0 | 10 | 3 | 0 | 7 | |
| Town/village access points | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | | NA | | 0 | 0 | 10 | 3 | 0 | 7 | |

Note: * Policies issued by 7 provincial committees and 3 county committees are analyzed. Only provincial committees have policies regarding provincial centers; R = reiterating, MS = more specific, LS = less specific.

Since 2009, the development of rural comprehensive information service stations has been brought increasingly in line with the MII's regulations and therefore increasingly in line with the top-down approach. However, unlike the public access points in the Cultural Sharing and Distance Education projects, the establishment of comprehensive information service stations is not guided by a detailed national plan, nor is it supported by dedicated organizational structures. Policies regarding the administrative and operational aspects of the resulting service stations are less definite in comparison with those of the Cultural Sharing and the Distance Education projects. For example, the 2009 MII document required that service stations should be adequately funded, but it did not explicitly identify the source of such funding; it simultaneously charged the stations with public service duties and allowed them to engage in business activities, but did not specify where the line should be drawn and how the balance between the two services should be maintained. Without a dedicated organizational structure and forceful implementation plan, MII's proposal to establish comprehensive information service stations has not been widely taken up by local governments. *The Action Plan for Agricultural and Rural Informatization in China (2010–2012)* 农业农村信息化行动计划 (2010–2012年), jointly issued by MII and a number of other ministries, proposes that by the end of 2012, stations conforming to the aforementioned MII criteria should be established in 30 percent of Chinese villages (Ministry of Industry and Information Technology, Ministry of Agriculture, Ministry of Science and Technology, Ministry of Commerce & Ministry of Culture, 2010).

RATIONALE, CHARACTERISTICS, AND IMPLICATIONS FOR COMMUNITY INFORMATICS OF THE TOP-DOWN APPROACH

As the foregoing sections show, the three major projects that established public ICT access in most Chinese villages can all be categorized as having followed the top-down approach. However, unlike those projects that focus purely on technology access (e.g., many of the telecenter projects across the world), these projects, particularly the Cultural Sharing and the Distance Education projects, have also developed their own content and services, which are provided in tandem with technologies. As a matter of fact, provision of technologies was mandatory for accessing the projects' resources and services. Therefore, what flowed from the top to the bottom (i.e., from higher-level governments and their agencies to townships and villages) included not only funds but also information resources, equipment, instructions, technical support, and some of the services (e.g., remote enquiry services). In addition, major decisions regarding the construction and operation of local access points/stations were also made at the top and communicated to the bottom to be executed. Local communities (townships and villages) have contributed some of the local resources

(e.g., staff and some funding), but in general, they are largely outside the hierarchy of decision-making and content-creation processes and have, consequently, contributed little to the operational policies and information contents of local access points.

It would be misleading and simplistic to see this process as a deliberate exclusion of local communities. It is worth recalling that all these projects were launched against the backdrop of rising rural crises, increasing urgency for rural development, and the hype of an ICT-driven national development strategy. Within this context, each of these projects was accorded tremendous importance by their respective agencies and was presented as such before the nation to earn political and financial support. The Distance Education Project, for instance, was seen as a critical means to improve the quality of rural cadres so as to improve the relationship between cadres and ordinary villagers and to enhance the foundation of CPC rule. The Cultural Sharing Project was seen as an important means to improve the quality of cultural resources in the countryside, which, in turn, is seen as critical to the modernization of agriculture and rural society. Rural comprehensive information stations were seen as facilitators to exploit information as a strategic resource, which, in turn, was believed to be able to unleash productivity of both labor and other agricultural resources.

The importance accorded to these projects meant that implementation of coverage had to be as wide as possible. Both the Distance Education and the Cultural Sharing projects explicitly pledged that by the end of the eleventh five-year planning period (2010), each of the 640,000 Chinese villages should have an access point with all the needed ICT to access their resources. The target of full coverage and the very tight five-year time frame mandated forceful and efficient implementation of the projects. Relying on the bureaucratic system to push forward their implementation became almost the only viable option. The Cultural Sharing Project, under the leadership of the Ministry of Culture, mobilized the cultural bureaus at each level of government; the Distance Education Project, under the leadership of the Organization Department of the Central Committee of the CPC, mobilized the organization departments at each level of the CPC committees; and the Rural Comprehensive Information Service Station initiative, under the leadership of the Ministry of Industry and Information Technology, relied mainly on local departments of information technologies. The central, provincial, and city/county government agencies were mainly mobilized for funding, expertise, technology, content creation, and project administration. Local communities were mobilized for venues, partial funding, and staff for local access points. Human resources needed for content creation, system design, and decision makings are too rare to mobilize at the township and village levels.

From the perspective of community informatics, the communities' lack of participation in decision making and content creation has serious im-

plications for the relationship between them and the resulting ICT intended to serve them. Not participating in the decision-making process means that local communities are in fact excluded from the delineation of a number of critical issues concerning their local ICT access, including: What are cultural resources? What are quality cultural resources? What are the goals of community-based ICT access? What are the effective ways to achieve these goals? Not being involved in content creation means that local communities have very few opportunities to tailor top-down information resources and develop new ones according to their own needs. This further means that communities are not fully engaged in shaping the local public access points on the basis of, for instance, their history, cultural heritage, institutions, social network structure, development needs, or demographic characteristics. How these implications manifest themselves in the specific contexts of highly diverse Chinese rural communities will be further examined using data collected from field investigations in the next section.

ICT WITHIN RURAL COMMUNITIES

In order to examine how these top-down projects manifest themselves in the provision of ICT at the community level, the authors of this study visited the countryside of three administrative units in Northern China. Two of these units are designated as cities in the Chinese administrative system and one is designated as a county. We investigated two in 2012 and one, in a similar study, in 2009. These areas were chosen primarily due to their accessibility. They are by no means representative of rural China as a whole, particularly in terms of social and economic development (table 6). However, as the previous sections of this paper have already shown, the three projects have been implemented largely according to a top-down approach—which has resulted in the establishment of fairly similar local ICT access points or stations across the country.

In addition to the data in table 6, there are some local characteristics of each of these areas that are worth special note. In comparison with other areas, City A (a county-level unit in the Chinese administrative structure) in Shandong Province is particularly notable for its economic strength (it ranked thirty-fifth in the top one hundred counties in China in 2011) and for its recent strategy toward integrated urban–rural development, an important part of which was to ensure equal public services for urban and rural residents. To achieve an economy of scale in public-service provision, the new strategy proposed to transform the city’s basic unit of rural social management from village to “community,” where one community consisted of 5–6 nearby villages and around 1,500 households. The “community” center is normally located in a geographically centered village within two kilometers of each of the other villages. It serves as the primary platform for all public services, which include, among others, a public

Table 6. Basic Geographic, Demographic, and Fiscal Data for the Three Areas Investigated

| County/City | Area (km ²) | Population (ten thousands) | Number of Townships | Number of Administrative Villages | Number of Natural Villages | Local Fiscal Revenue (billions) |
|-------------|-------------------------|----------------------------|---------------------|-----------------------------------|----------------------------|---------------------------------|
| City A | 2183 | 108 | 10 | 208* | 1257 | 4.01 |
| City B | 9025 | 200 | 27 | 265 | — | 4.41 |
| County C | 1210 | 24 | 11 | 212 | 379 | 0.2 |

Codes instead of names are used here to refer to the three case-study areas. Data for City A is based on statistics for 2011 (collected during field investigation).

*Number of administrative villages here (208) refers to the number of “communities,” which have replaced administrative villages as the basic unit of social management. Data for City B is based on statistics for 2010 (Source: The Government Website, <http://www.yinchuan.gov.cn/yczw/>). Data for County C is based on statistics for 2011 (collected during field investigation).

reading room, an electronic reading room (ICT access points), a classroom with distance-education facilities, and an inquiry desk for agriculture science and technology.

City B is a subprovincial administrative unit in the Ningxia Hui Autonomous Region with 265 villages under its jurisdiction. It is perhaps most notable for its concentrated population of the Hui ethnic and religious group. According to official statistics for 2010, there are 460,000 Hui people in City B, accounting for 23.1 percent of the city’s total population; there are 118 villages with a high proportion of Hui residents (in 71 of these villages, the proportions are more than 90 percent). As Huis are generally Muslim, there are over 500 Islamic mosques across the city’s territory. The city is also well-known for its progress in rural informatization. Starting in 2007, as part of a strategic plan to push forward rural informatization in Ningxia, the regional government began a project to extend the coverage of broadband networks to townships and villages, develop an integrated rural information service platform, and establish rural comprehensive information service stations in every township and village. This placed Ningxia in a fairly advanced position in the country in terms of rural informatization.

In comparison with City A and City B, County C of Hebei Province is the least developed. Its mountainous geography brought great advantages to the county’s anti-Japanese fighters during Japan’s invasion of China, which earned it the designation of “Old Revolutionary Site” 革命老区, but this same geography now greatly hinders the county’s economic and social development. With less than 200 million RMB in fiscal revenue for more than 200,000 people a year, the county has also been designated as a “county of poverty of China” 国家级贫困县 and receives state subsidies for this reason.

Just as in other parts of rural China, townships and villages in these areas are provided with public access to ICT by one or more of the aforementioned projects. Although these projects are administered by different government agencies, at the bottom level they tend to share venue and facilities. In reality, therefore, when a project claims to provide access points for rural communities, it may simply mean adding some facilities and/or services to an existing point. Therefore, at the township and village level, it is not uncommon to find the presence of many projects, not just the three mentioned above, within one access point. This is shown by the display of multiple signs at the entrance of the access point. This combining of different projects is called “thousands of threads at the top come into one needle at the bottom.” So the most common form of ICT provision at the township and village level is a service station with a variety of ICT inside and multiple signs outside. This is also the most common form found in the three areas investigated.

In City A in Shandong Province, ICT access points are established primarily through the “electronic reading rooms program” of the Cultural Sharing Project. They are therefore built mainly in accordance with the standards set by the Ministry of Culture and are overseen primarily by the city’s Bureau of Culture, Broadcasting, and Press. The electronic reading room is almost always housed in the newly developed “community” center, next to the traditional reading room. As in other regions of China, these ICT access points also have additional equipment from the Department of Organization of the local CPC Committee and are designated as the joint access points for both the Cultural Sharing and the Distance Education projects. Consequently, the primary intended function of these access points is to provide access to the two projects’ resources. For the Cultural Sharing resources, this in fact means access to resources created by the national and provincial centers, as the city center in City A contributed very little in the way of locally created resources, which, according to interviews with the center staff, mainly consist of video recordings of locally held lectures or training sessions. With regard to the Distance Education resources, this means access to resources hosted by the national, provincial, and city centers, respectively. To facilitate access to these resources, most electronic reading rooms have bookmarked the Web sites of both the Cultural Sharing and the Distance Education centers. In addition to providing access to information resources, electronic reading rooms in City A also hold ICT training for local residents, but this appears to be rather irregular.

In the countryside under the administration of City B, public access points were mainly established through the regional government’s initiative for rural comprehensive information services, which established a regional rural comprehensive information service platform (a Web-based information system developed by China Telecom’s Ningxia branch under

contract to the regional government) and a comprehensive information service station in every village throughout the region. It was decided that each station would have one or more computers, a TV set, a set-top box, and a broadband connection as the basic equipment; that it would provide access to resources offered through the regional rural comprehensive information service platform and the Cultural Sharing and Distance Education projects, as well as to general Internet resources; and that it would operate as a public service for the first few years, with regional and local governments sharing the costs. Each station was to find a sustainable business model three to five years later. In villages where a Distance Education access point was already in place, new functions and equipment relating to the comprehensive information service station were added, accompanied by a sign, "Rural Comprehensive Information Service Station," at the entrance.

At the time of our survey (the end of 2009), City B had already established comprehensive information service stations throughout its countryside. Most of the stations were located within the village committee building and were staffed either by a village committee member or a college graduate assistant to the village leader 大学生村官. Specific services and priorities varied from station to station, but were centered largely on the following: access to the Ningxia Comprehensive Rural Information Platform, the Cultural Sharing resources, the Distance Education resources, and general Internet resources; uploading of local product information, market information, and other related information to the Ningxia Rural Comprehensive Information Service Platform; organization of general training sessions and party member classes; and assistance with specific information searches. Of these, access to the Cultural Sharing resources, the Distance Education resources, and the Ningxia Rural Comprehensive Information Service Platform was regarded as the core service, with each of these resources being featured prominently on both the IPTV menu and the computer desktop.

In County C in Hebei province, public access points were built primarily through the Distance Education project. They typically consist of one teaching/meeting room equipped with an Internet connection, a TV set, and a set-top box. The Organization Department of the County Committee of the CPC began to push the establishment of such access points in 2007, in accordance with the directives from the Organization Departments of the Central and Provincial Committees of the CPC. The provincial and county governments together provided funds for Internet connections and set-top boxes to all villages, and subsidies for construction to some villages where a venue to house the access point was not yet available. The county government also paid the annual fees for the Internet connections of all villages. As of the summer of 2012, 170 out of 212 villages in the county have established such access points. They are managed by the

village committee members or college graduate assistants or elected youths. The core services here are access to the Distance Education and the Cultural Sharing resources and organized training based on these resources.

Facilities and services provided by the access points of the three case-study areas are summarized in table 7. As the list of services in table 7 shows, top-down information provision dominates the service offerings of these access points. Even locally organized training sessions mainly follow the program set by higher levels of government and utilize materials from the Cultural Sharing and Distance Education resources. Given the fact that at the top level, each project has its own agenda—the Cultural Sharing Project disseminates quality Chinese cultural resources as defined by the central government, and the Distance Education Project enhances party leadership—services focused particularly on access to these resources will unlikely pay adequate attention to community characteristics and needs.

There are special cases, albeit very few, where ICT is devoted to meeting the special needs of the community, which demonstrate that such a potential does exist. One of these cases was a village in the countryside of City B.

Table 7. Facilities and Services Provided by Local ICT Access Points in the Three Case-Study Areas

| County/ City | Facilities | Staff | Main Services |
|-----------------|---|---|--|
| City A | Around 20 computers, broadband connection, TV, set-top box, projector | A full-time college graduate who is also responsible for the reading room of printed materials | Access to the Internet in general, access to the Distance Education and Cultural Sharing project resources, ICT training, party member classes based on Distance Education resources |
| City B | 1 or more computers, broadband connection, TV, set-top box, projector | A village committee member or a college graduate assistant who looks after the access points as part of his/her many jobs | Access to the Internet in general, access to the Distance Education and Cultural Sharing project resources, access to the Ningxia rural comprehensive information service platform, uploading of local information to Ningxia rural comprehensive information service platform, ICT training, party member classes based on Distance Education resources |
| County C | Internet connection, TV, set-top box | A village committee member or college graduate assistant or a selected model youth who looks after the access points as part of his/her many jobs | Access to the Distance Education and Cultural Sharing project resources, party member classes based on Distance Education resources |

This was a Chinese-artichoke-growing village with a Chinese-artichoke field of around a 1,000 Mu (around 165 acres), accounting for one-third of such fields in the whole township. The information officer responsible for the village's comprehensive information service station was a graduate assistant. She bookmarked all related information and training sessions on the Ningxia Rural Comprehensive Information Service Platform and established personal contact with the Chinese-artichoke specialist on the staff of the enquiry center of the platform. Every year at harvest, she would post the product information to the platform at the earliest possible time. This not only attracted Chinese-artichoke dealers from various places across the country but also a company who was interested in building a factory to process the local Chinese artichokes. Such benefits also spurred other uses of the station.

In 2008, a number of villagers purchased a new brand of grain seed but were not very sure about the trustworthiness of the seeds. So they brought the seed to the information officer and asked her to check it on the Internet. Having found very little relevant information on the Internet, the graduate assistant called the enquiry center of Ningxia Rural Comprehensive Information Service Platform, where a specialist happened to be involved in the R&D process of the new seed. On hearing of the villagers' worry, the specialist promised to either refund their money if they wished to return the seeds or to provide them with technological support if they wanted to plant the seeds. After careful consideration, the villagers returned the seeds and received their refund. Three factors seem to be at work in this case of community-oriented use of ICT: an element (albeit limited) of two-way communication that the Ningxia Rural Comprehensive Information Service Platform supported, a college graduate who saw herself as part of the community, and a fairly explicit common need of the community.

Another case in which ICT was used to meet community needs occurred in a village in County C. In 2008 three computers were donated to the village. These were added to the equipment already provided by the Organization Department of the local committee of the CPC. Four families in the villages soon found a special use for these computers. A grown-up child from each was working in Shenzhen as a migrant worker and the families began to use these computers for video chat with their children.

These cases demonstrate that it is possible to exploit public ICT for specific community needs. However, in general, such uses are the exception rather than the rule. It is not uncommon to see that both those providing ICT access and those who are the beneficiaries appear oblivious to the possibility of applying ICT to local issues, even when such issues become acute and obvious. In City A, for instance, the creation of "communities," which superseded villages as the new unit of rural social management, means that there is an urgent need for preserving village heritage, culti-

vating community identity, and facilitating interactions between villages within a community. Preserving a village's heritage while fostering a new community identity is a particularly great challenge, because, dating back to the ancient Qi 齐 of the Spring and Autumn Period, City A has many villages within its jurisdiction that have an extremely rich heritage. However, field investigation did not find any use of the public ICT for this purpose. Another example that may be suggestive of the lack of community focus in these ICT provisions is the fact that few communities exploited ICT to promote local products. Most villages we visited in the three areas had a product in which the village attempted to specialize (this is called the "one village one specialty"一村一品 development strategy). Except for the success story of the Chinese-artichoke village in City B, very few villages seemed to be even aware of such potential.

Similarly, apart from accidental cases like the one where parents used public access computers for video chat with their migrant children, there has been little intentional and systematic effort to embed ICT in social networks for the purpose of fostering the social capital of the community. This is so even when such social networks clearly exist. In contemporary rural China, in addition to interpersonal social networks involving neighbors, friends, relatives, etc., people can also be connected through various organizations and associations such as children's schools, women's associations, associations of people with disabilities, various agricultural associations, religious groups, and interest groups. In City B of Ningxia Hui Autonomous Region, for instance, mosques and other Islamic groups are widespread; in County C of Hebei Province, a number of villages reported having performing art groups. Field investigation found little evidence of the use of public ICT by these groups, nor did we find their virtual presence on the Internet through the local ICT.

The distance between this public ICT and the communities it serves is also reflected in their low level of use. During the field investigation, the research team rarely encountered users at the local access points, and when the team asked about their average usage, a common figure reported by ICT access points in City A (equipped with twenty computers and serving around 1,500 households) was around ten people daily. The amount of usage appeared even lower in the other two areas.

Such is the status of public ICT provision to rural communities resulting from the three top-down national projects. This study is not intended to be a systematic evaluation of these projects—hence it is unable to draw definite conclusions regarding their overall effectiveness and impact. However, from what has been observed in this study, it is safe to say that, although all projects have drawn on the Socialist New Countryside vision to underscore their agenda, the communities are not yet at the heart of their ICT provision, nor is the value of this ICT entrenched in the hearts or minds of community members.

CONTEXTUALIZING THE ROLE OF COMMUNITY INFORMATICS: DISCUSSION AND CONCLUSION

As the foregoing analysis shows, beginning in the tenth five-year planning period, and against the backdrop of China's "industrialization through informatization" development strategies on the one hand and the rising rural crisis on the other, the Chinese government began a series of projects to improve rural information access using modern ICT. The most influential of these are the Cultural Sharing and the Distance Education projects, and to a lesser degree the rural comprehensive information service station initiatives. These projects focused on cultural resources, educational resources, and agriculture and business information, respectively. To ensure local access to this information, these projects have taken as part of their aim the establishment of community-based ICT access points in every village. As a result, the majority of Chinese administrative villages now have some kind of public access point to modern ICT. At the most basic service level, a village will have a TV, a set-top box, and an Internet connection. Some have, in addition, one or more computers and a broadband connection. By providing basic ICT access points throughout the countryside, these projects have enabled almost every part of rural China to be connected to the information superhighway.

These projects have all adopted an entirely top-down approach. Not only is the bulk of the funding provided by central, provincial, and city/county governments according to the ratio and arrangement determined by the central government, key information resources also flow from the higher-level project centers to the communities. Even policies regarding the main operational aspects of ICT access points are primarily formulated by the central government. Very complex organizational structures were established to ensure efficient execution of project plans at each level and the smooth flow of information resources from higher-level project centers to community access points. Within this structure, the township governments (the lowest level of government in the Chinese administrative system) and villages have had a very limited role in decision making and resource creation. The major role of the villages, in particular, was reduced to little more than keeping the village access point open and organizing activities (e.g., training) required by higher-level project management.

The national and rural development contexts in which these projects were launched not only placed tremendous strategic significance on these projects but also provided the rationale for this full-fledged top-down approach. On the one hand, the top wants quick and efficient deployment of resources to achieve the target of full coverage, for which hierarchies of the bureaucratic system provide a forceful guarantee; on the other hand, the communities want ready-made systems and services, which they themselves lack the know-how to design. In addition, professionals (e.g., the

library and information professionals) who want to capitalize on the opportunity of rural development and who have been entrusted with the tasks of setting up local ICT access points, rely very much on higher-level directives when lobbying for local political and financial support. The scale of ICT coverage achieved and the amount of information resources developed by the Cultural Sharing and Distance Education projects so far would have been unimaginable without strategic planning from the top and forceful execution by all levels of government. Although there have been many commendable bottom-up ICT initiatives across the country as these projects have been rolled out, it is these top-down projects that have made public access to ICT a universal phenomenon in rural China.

This study did, however, find that technologies and resources made accessible by these projects do not necessarily bring community empowerment. Although there are special cases where ICT was exploited to meet special community needs, in most communities, even where computers were relatively abundant and broadband was available, public access points were primarily conceived as access points for the Cultural Sharing and the Distance Education resources. Therefore, in general, the use made of these ICT facilities is very much limited by the two projects' visions and designs, which, due to their national perspective, cannot possibly accommodate very specific local needs. This will likely affect community interest in using such ICT facilities. Moreover, because resources provided by these projects concentrated mainly on areas such as entertainment, education, current affairs, general science, and technology, i.e., areas and types of content available through other devices, (e.g., home TV), public access points tied up with these projects inevitably suffer from a lack of interest from local communities.

It can be argued that behind the contrast between a fairly-well-developed physical access infrastructure and latent community empowerment lies a great opportunity for emerging community informatics in China. There are notable potentials to exploit the provided ICT beyond its intended functions. The need to preserve rich village heritages while fostering new "community" identities in the face of village restructuring in City A, the need to connect parents and their migrant children in County C, and the possibility of supporting "one village one specialty" in City B, are just a few examples of blending points between ICT and community development. Identifying such points for each community and helping to transform the top-down model of ICT into one that is more community oriented are areas to which community informatics can make great contributions; clearly, there is a tremendous opportunity at hand for the newly imported community informatics to participate proactively in the existing top-down ICT projects in rural China.

One way for community informatics to join with the top-down projects is to take some of the established local public access points and rede-

sign their services/functions in accordance with community informatics principles to showcase community orientation in specific local contexts. A number of the community informatics principles mentioned at the beginning of this paper are of particular relevance in this regard, notably the focus on the community vis-à-vis the state and individuals, emphasis on the embeddedness of ICT in community life and social networks, and espousal of the participatory (bottom-up) systems and service design. Focus on the collectivity of communities will lead service designers to heed not only the needs of individual community members but also the collective needs of the community and the historical, institutional, cultural, and social contexts that give rise to such needs. Similarly, the emphasis on the embeddedness of ICT in community life and social networks helps service designers to see the potential of local ICT to meet not only the communities' information and training needs but also a great variety of other production (e.g., e-commerce) and social (e.g., social networking) needs, to facilitate not only dissemination of information from the top but also community interaction and engagement from the bottom. This will likely open up a wide range of new possibilities for local ICT access points to serve communities beyond those envisaged by the Cultural Sharing and Distance Education projects.

Internationally, the top-down and bottom-up applications of ICT to community development have always been regarded as two parallel, if not contradictory approaches. Originating in community activism and community networking movements, community informatics in the West has been intrinsically bottom-up in its approach. Being introduced into China as such, where the political, institutional, and development contexts have made the entirely top-down approach much more prevalent, community informatics will likely face great challenges in adapting itself to this new environment. Analysis of existing top-down projects in rural areas shows that there is ample room for the two approaches to work hand-in-hand. This calls for prudent ascertainment on the part of community informatics regarding its relationship with both the communities and their needs and the government and its developmental agenda.

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