

Greater China, including the special administrative district of Hong Kong, as well as Taiwan (the Republic of China), offers a glimpse into how e-government can be harnessed for diverse political ends. On the one hand, the People's Republic has utilized it as a means of promoting growth and curbing corruption; Hong Kong and Taiwan, however, which are far more democratic in nature, have focused on the quality of everyday life. In both China and Taiwan, much of the most innovative uses of e-government occur at the municipal level.

3.1 The People's Republic: e-government in the Middle Kingdom

The world's most populous country (population 1.35 billion), with its second largest economy, makes the scale of e-government there of significant interest. China emerged from a period of international isolation in the late 20th century to become an economic and political behemoth. Fueled by an influx of foreign direct investment (FDI), it is the world's largest producer of steel, cement, textiles, electronics, toys, and numerous other products. It has enjoyed rapid rates of growth, averaging 7% annually, for decades, a process that has created a vast middle class with considerable purchasing power. Most of this growth has been concentrated along the Pacific Coast, leaving large parts of the interior underdeveloped. Half of China now lives in cities, which are often congested and suffer severe air pollution problems. The government is renowned worldwide for the severity of its oppression, censorship, corruption, and lack of human rights and democratic reforms.

Digital technologies and telecommunications have formed an integral part of the country's transition from socialism into an increasingly prosperous, globalized, and devoutly capitalist society. Since then, Damm (2007) notes, rising Internet penetration accompanied the development of a consumerist culture, increasingly severe social fragmentation, and a growing interest in identity politics. The state has long viewed information technology as essential to productivity growth and national competitiveness. For this reason, China's ventures into e-government have attracted considerable attention (Yong, 2003; Holliday and Yep, 2005; Ma et al., 2005; Chen et al., 2009; Zhao, 2010; Yang et al., 2012; Schlaeger, 2013). In 2016, China's Internet penetration rate was 52.3%; its 721 million netizens are the largest such national population in the world. In 2015, China's e-government readiness score was 0.5359, higher than most countries in the developing world but below that of the industrialized world. E-participation stood at a remarkably low 0.2105, indicating that the government's initiatives to construct e-government have outpaced most people's ability to utilize it. Since the 1990s,

the state has laid over 2 million km of fiber-optic lines, forming a coherent nationwide grid. Global lines connect China to the world, including the enormously powerful TransPacific Express cable that crosses the Pacific Ocean to the United States.

The development of the Chinese Internet began in the late 1980s, at the behest of the Chinese Academy of Sciences. On September 20, 1987, Professor Qian Tianbai of Hsing Hua University sent China's first email titled "Crossing the Great Wall to Join the World." In 1987, the China Academic Network (CANet) and the Institute for High Energy Physics erected digital networks. Well-respected universities such as Fudan, Tsinghua, and Shanghai Jiatong became connected. In 1993, the State Education Commission established the China Education and Research Network (CERNET), with the goal of networking all of the country's institutions of higher learning. Government agencies such as the Ministry of Post and Telecommunications began digital networks. The Ministry of Electronics established a publicly owned corporation, Jitong, to encourage Internet diffusion. As incomes rose and the price of personal computers dropped, Internet use grew rapidly. Platforms such as Weibo and microblogging rose in popularity. Today China has embraced e-government in a variety of ways. Mobile phones are hugely popular as well: there are more than 1 billion users in the country, a 92% penetration rate; roughly one-third of the country's netizens rely on their smartphones for access.

With its own legitimacy highly dependent on sustained economic growth, the Chinese government sought to harness e-government as a means of promoting development, reducing administrative costs, and improving efficiency. Schlaeger (2013) notes the paradox of an authoritarian government attempting to become more service-oriented through the use of e-government. While the Internet offers Chinese citizens new avenues for civic participation, e-government may serve as a means of legitimating the regime in the eyes of the country's rapidly growing middle class, or providing stability in governance (Kluver, 2005). In this view, e-government is a little more than a means of salvaging a state that is badly outmoded and inefficient, a way of reducing corruption and creating a patina of transparency. Whether electronic government opens the door for a broader process of democratization in China remains to be seen, although to date it appears that so far e-government, or the Internet in general, has generated little substantive change in the country's political climate. The most optimistic statements in this regard tend to come from Western observers, not Chinese. Occasionally, groups such as Falun Gong make use of the web to challenge the state, and it has been harnessed to give voice to anger over environmental problems, disasters, and local corruption. However, the government expends considerable funds (514 billion yuan, or \$77 billion in 2009) to "maintain social stability" (Schlaeger and Jiang, 2014). It could be that e-government remains little more than a thin veneer covering a deeply corrupt, often inept, and notoriously tyrannical state. Lollar (2006), for example, in a detailed examination of 29 government websites, found little evidence that they promote e-democracy. As Schlaeger (2013, p. 2) puts it, "E-government must therefore be seen as yet another type of propaganda, and there are multiple examples that support the interpretation that the Chinese government can successfully shape the Internet and e-government to suit their own interests." Content on government websites is controlled by the state's policy of "guidance of public opinion" (*yulun daoxiang*) and the Internet police. In short, Chinese

e-government may simultaneously reinforce but perhaps also challenge the prevailing power relations that run through the state. Such comments indicate that e-government in dictatorial one-party states such as China differs markedly from that of democratic Asian states such as Japan or South Korea.

3.1.1 *Origins and development of Chinese e-government*

China's e-government approaches arose haphazardly and were badly fragmented by competing public bureaucracies. Deng Xiaoping noted that informatization would be a key part of national development in 1984. In Chinese, the term "e-government" (*dianzi zhengwu*) typically refers to government web applications, whereas "informatization" (*xinxihua*) refers to the broader ranges of information technology applications. Key to this strategy was the notion of technological leapfrogging and a perhaps exaggerated emphasis on information technology as the means to catch up with, or surpass, the West. Since then, the national government has spent more than 1 trillion yuan (\$120 billion) on e-government and initiated wave upon wave of projects to encourage its growth and use. In many respects China's strategy sought to emulate the success of e-government in Western countries (Zhang, 2006), albeit tailoring it to the specific context of one-party authoritarian rule. Not only has e-government become widespread but also its use has shifted gradually from simple acquisition of information online to interactive services such as tax and bill payments and license registration.

Successive 5-year plans have trumpeted the need for developing and using a sophisticated information technology network. The first formal implementation occurred in 1994 (Chen et al., 2006), or roughly 15 years after the initiation of Deng Xiaoping's reforms that liberalized the economy and reintegrated China into the world system, although the CANet and the Institute of High Energy Physics network had undertaken steps even earlier. Fudan University, Tsinghua University, and Shanghai Jiaotong University were the first academic institutions to become directly connected to the Internet. In 1993, the State Education Commission formed the CERNET to link all the country's universities. Government websites grew rapidly, and comprise about 4.3% of all of those in the .CN domain (Zhau, 2004). The government is by far the largest owner of information resources in the country, with more than 3000 databases. By 2006, online portals were found in 100%, 93%, and 69% of provincial, city, and county government offices, respectively. An administrative structure to guide the growth of e-government was clearly needed. As Zhang (2002, p. 169) notes, "the origin of Chinese e-government can be traced to the establishment of the Joint Committee of National Economic Informatization in 1993." In 1996, it set up the State Council Informatization Leading Group, the nucleus of what would become the Ministry of Information Industry (MII), which has supervised subsequent developments.

In the 1990s, the Chinese government launched a series of parallel projects, which became the early core of e-government, collectively known as "the Golden," as all contained the word in their title. The Golden Bridge (*jīn wǎngqiáo*) project, which started in 1993, sought to link public and private networks by building a national infrastructure backbone of fiber-optic lines. The Golden Card (*jīn kǎ*) project was aimed

at fostering a national credit card system, unified payments system, and e-banking, a response to the country's fragmented banking system that often makes it difficult to clear transactions. More than 200 million cards were handed out in the next decade. It also encouraged the growth of ATMs and point-of-sale terminal networks. The Golden Bridge (*jin qiao*) focused on providing commercial Internet service to corporate clients, creating the infrastructure over which other networks would run. The Golden Customs or Gate (*jin guan*) project sought to connect foreign investors with banks and the customs department using electronic data interchange (EDI) (Holliday and Yep, 2005), which was also a means of curtailing smuggling and enhancing tariff revenues (which rose 22% in one year). The motive behind the Golden projects was to "unify the country by tying the center to the provinces and by allowing the government to act across ministerial and industrial demarcation lines" (Zhang, 2002, p. 170). Other Golden projects included Golden Sea or Golden Macro (*jin hong*, to set up centralized, networked databases on prices, investments, and resources to enable government bodies to communicate better regarding economic policy), Golden Taxation (*jin shui*, to enable banks to direct funds across the country and minimize tax fraud by adding digital codes to receipt to allow computers to compare sellers' declared revenues and buyers' expenses), Golden Intelligence (*jin zhi*, to allow teachers and researchers access to databases), Golden Agriculture (*jin nong*, to monitor agricultural supervisory committees and forecasting), Golden Enterprises (*jin qi*, to link 12,000 small- and medium-sized enterprises), Golden Health (*jin wei*, to distribute information technology to the medical community and encourage long-distance sharing of health information), Golden Housing (*jin jia*, to form a national property database), Golden Water (*jin shui*, to create a national database used for water conservation), Golden Cellular (*jin feng*, to develop a national mobile phone system with roaming standards), Golden Trade (*jin shāngyè*, to promote e-commerce and intellectual property), Golden Finance (*jin jīnróng*, to enhance the management of national financial revenues), Golden Social Security (*jin bao*, to note changes in the national labor market), Golden Switch (*jin jiāohuànǐ*, to accelerate domestic projection of digital switching technology), and Golden Audit (*jin shen*, to create a centralized auditing system). These grandiose visions were remarkably limited in scope, each to a prevailing sector of the state (Table 3.1).

Table 3.1 The Golden projects

	Year initiated	Purpose
Golden Bridge	1993	To promote Internet connectivity for large firms
Golden Customs/ Gate	1993	To connect foreign investors and enhance tariff revenues
Golden Sea/Macro	1993	To facilitate interagency economic communications
Golden Taxation	1994	To minimize tax fraud via online reporting of receipts
Golden Intelligence	1994	To connect researchers and teachers
Golden Agriculture	1994	To monitor agricultural supervisory committees

Table 3.1 The Golden projects—cont'd

	Year initiated	Purpose
Golden Card	1995	To create a national credit card and payments system
Golden Health	1996	To promote information sharing among health professionals
Golden Cellular	1996	To create a national mobile phone system
Golden Switch	1997	To generate a national switching system for telephone calls
Golden Housing	1997	To create a national property database
Golden Trade	1998	To promote e-commerce and intellectual property
Golden Shield	1998	To develop national linked crime databases
Golden Social Security	1999	To monitor changes in the national labor market
Golden Enterprises	2000	To network small- and medium-sized enterprises
Golden Tourism	2001	To promotion tourism products and services digitally
Golden Water	2001	To create a database of water resources for conservation
Golden Finance	2002	To improve management of national financial revenues
Golden Audit	2002	To establish centralized auditing of government agencies

In 1999, the Goldens were followed by a second state initiative, the Government Online Project (*Zhengfu Shangwang Gongcheng*), which sought to put most government functions onto the web, a strategy designed in part to overcome the sectoral differences of the various Golden projects. It was sponsored by China Telecom, which saw an opportunity to lease its lines to government offices and thus subsidize website development, and more than 40 central government departments. Its website (<http://www.gov.cn>) was designed as the model for other public webpages to emulate. The initiative unfolded in three steps: first, to connect government offices to the Internet; second, to establish interagency compatibility; and third, still in the making, to make these agencies paperless. It focused on putting government documents on the web; promoted online databases, welfare payments, and bidding for government contracts; and sought to connect 80% of government agencies within a year (later this was postponed until 2005). One element, the National Population Information Network, sought to provide police departments with digitally collected information about all citizens older than 16 years, ostensibly as an aid to recapture escaped prisoners. The project offered guidelines, incentives, promotional resources, and informational centers, and was implemented on a trial basis in 100 cities. Government Online also encouraged active collaboration between the state and private information technology producers, including hardware and software manufacturers. It also drew advertising revenues from foreign and domestic firms (e.g., Microsoft, IBM, and Cisco). By the government's modest standards, the project was reasonably successful: within 2 years, 80% of government agencies had established websites, including numerous ministries (Agriculture, Culture, Labor, Railways, Foreign Affairs, etc.), national bureaus (Sports, Forestry, Surveying, Tobacco, Weather, etc.),

and the People's Bank of China. By 2009, China had more than 45,000 government websites (Luo, 2009).

Government Online was followed by Enterprise Online, focused on e-commerce. In 1998, China's first government-to-business e-commerce website was established in Xiamen, which allowed government purchases to be tracked online. Enterprise Online, which started in 2000, was largely aimed at 1 million small- and medium-sized enterprises, and some large state-owned corporations. The initial stages encouraged the use of email and participation in online trade fairs. Subsequent ones sought digitized information on supply chains, Internet-based accounting and inventory control, and the creation of value-added services. However, many state-owned enterprises are averse to conducting e-business. The state's encouragement of economic activity online recognized that successful e-commerce requires a payment system that is convenient and secure. Finally, the state also planned a Households Online project, although the rapid growth of Internet usage driven by the private sector has largely rendered it obsolete.

In 2001, the State Council, the Communist Party's agency that undertakes such tasks, issued the China E-Government Application Model Project (*Zhongguo Dianzi Zhengwu Yingyong Shifan Gongcheng*). Since then, high-ranking leaders such as Jiang Zemin and Zhu Rongji have emphasized the role of e-government in high-profile speeches. In 2006, the government announced the State Informatization Development Strategy, which outlined national informatization goals for the next 15 years. In 2015, China announced its latest initiative, Internet Plus. As Mensah and Jianing (2016, p. 2426) explain,

The Internet Plus strategy seeks to integrate mobile Internet, cloud computing, big data and the Internet of Things with a focus on modernized manufacturing that will encourage the development of ecommerce, industrial networks, Internet banking and assist Chinese companies in increasing their international presence in the world.

This new model reveals a novel level of sophistication, emphasizing mobile e-government services and the state's emphasis on the business community. It is also firmly geared to maximizing the effectiveness of China's external ties, notably along the emerging digital Silk Road routes crossing Eurasia as well as to Africa.

China has made rapid inroads in e-health, including digital medical records (Gao et al., 2013). Telemedicine has been a notable success story (Hsieh et al., 2001; Xiue and Liang, 2007). The process began as early as the 1980s, and grew rapidly. In 1998, the first Internet conference between health care professionals in Xian Medical University Hospital and Stanford University took place. Efforts were redoubled after the severe acute respiratory syndrome (SARS) epidemic of 2003. In 2005, the first telesurgery took place when a doctor in Beijing removed a brain tumor from a patient in Yan'an, the same year that it first occurred in the United States (Gao, 2011). Teleconsultations and telehealth education programs have become widely available (Zhao et al., 2010). Separate telemedicine networks are run through the Golden Health program, the People's Liberation Army (PLA), and the International MedioNet of China (Wang and Gu, 2009). The PLA "established a telemedicine network in the early 1990s that covers more than 100 bidirectional satellite stations in the army, military hospitals, and

some rural army clinics” (Cheng and Mehta, 2013, p. 293). The MedioNet connects specialists in roughly 300 hospitals. Some hospitals offer text services that remind and inform patients about medicines (Ma et al., 2005).

These efforts have been supplemented by a the wider strategy to shift the nature of the state from direct supervision to macroeconomic management, gain control over corruption, unify technology standards, enhance responsiveness, increase productivity, and accelerate economic competitiveness under the National Informatization (*Guojia Xinxihua*) plan. Indeed, e-government is central to the effort to decentralize the tasks of public administration, and, paradoxically, to enhance the central government’s oversight (Ma et al., 2005). The formal reasons for implementing e-government include attempts to transform the nature of government functions (i.e., clearly delineate agencies’ obligations and duties), reengineer the structure of the state to become more lean and mean, and enhance transparency, openness, and responsiveness. Broadly, the intended result was to shift away from direct supervision of local agencies and publicize their functions and duties. The e-government campaign to reduce corruption aimed at diminishing the role of informal ties, i.e., *guanxi*, and the kickbacks that are a common part of the operation of the Chinese state. In 2013, the Ministry of Supervision received 15,253 online reports from citizens about government officials’ malfeasance and negligence (Zhao et al., 2015).

Yet in practice the very force that the state wishes to harness to expedite economic growth is also the one that could challenge the monopoly on power and information held by the Communist Party. Access to e-government requires access to the Internet, which is increasingly difficult to control. This tension reflects the broader conflict throughout China between the older, nationalist center of power concerned with retaining its monopoly over information and the newer, privatized, and globalized centers that tolerate diverse flows of information. In short, China wants to promote and rein in the Internet simultaneously. This contradiction plays out in the implementation of e-government among the country’s counties and cities. Seifert and Chung (2009) hold that whereas e-government in the United States was designed to inject business principles into governance and make the state more citizen centered, in China it is aimed largely at enhancing the central state’s scrutiny of cities, in which bureaucrats in Beijing can keep track of municipal taxes, contracts, and expenditures.

Thus, e-government can constitute both two-way flows of information and power or one-way panopticonic surveillance, depending on national political and cultural contexts. E-government is not synonymous with democratization. Enhancing citizen power is feasible in well-established democracies with an independent media, but e-government can hardly be expected to perform such a role in one-party systems such as China, with its abysmal record of human rights, censorship, and authoritarian control. Even the goal of reducing corruption through e-government has been implemented more with an eye toward creating a good business climate for investors than promoting democratic governance.

3.1.2 Municipal e-government in China

Although most attention to China’s e-government has been directed at the actions of the national government, a surprisingly diverse set of practices are found at a smaller

spatial scale. At the municipal level, wide variations exist in the degree to which e-government initiatives have been adopted in Chinese cities (Lu et al., 2007; Fan and Luo, 2013). Whereas national e-government directives were delivered in top-down fashion from Beijing, at the local level these emerged more organically and unevenly. Inevitably, because information technologies are wrapped up with various configurations of power, the introduction of such measures changed the relative power of the central and local state (Schlaeger, 2013). Local governments are granted considerable autonomy in the degree to which they may implement e-government measures, with wide variations in the quality of websites and services (Shi, 2007). Some have reacted defensively out of fear that local corruption and mismanagement will be exposed. Others have very well-developed Internet infrastructures, with widespread broadband use. Not surprisingly, prosperous and globalized cities such as Beijing, Shanghai, Nanjing, and Shenzhen have taken the lead (Tan, 2013).

The Shanghai metropolis, home to 23 million people, is perhaps the best-connected city in the country and the center of its producer services economy, and it has become China's most successful example of municipal e-government. It took rudimentary steps even before the national government embraced e-government, such as establishing an official website early (www.shanghai.gov.cn), which offers news and information about government affairs. The city united 19 local universities in the Shanghai Science and Education Network and formulated a centralized, carefully crafted strategy to utilize information technology as much as possible.

In 1998, eight local agencies submitted plans for smart cards that could be used for a variety of purposes (Chen and Huang, 2015). In 1998, in a vast undertaking overseen by the Shanghai Municipal Informatization Commission, the city began an all-inclusive digital social security smart card system that accesses a centralized database containing detailed personal information about holders (including fingerprints and medical insurance account numbers) (Lili Cui et al., 2006). Four types of cards are issued: blue, for users older than 16 years; red, for those older than 70 years; golden, for retired officials; and green, for students younger than 16 years. Users can access terminals in a variety of places, including hospitals and government offices, and through them can perform numerous functions: apply for home loans and drivers' licenses; register employment status, marriages, and divorces; apply for unemployment subsidies; make housing payments; and claim medical expenses. The project proceeded in three stages: the first, starting in 1998, brought together a project team and developed the infrastructure and regulatory framework, and publicized it to the city's residents. The second, in 2001, laid down guiding principles and practices, detailed the roles of different agencies, and initiated training programs. The third, beginning in 2003, popularized the cards and began mass dissemination. By 2005, more than 9.3 million cards were used by 70% of the target population. Careful planning went into this project, which drew on local pools of engineers to provide technical support. Partnerships between the city's public and private sectors were established. The city's e-government services have become indispensable for firms operating there.

In 2013, the Shanghai Government Data Service Portal was opened, and it provided an enormous array of small but important services online: payments of utility bills, fines, tickets, and taxes; applications for licenses; scheduling of appointments with

public officials; registration of sales and purchase of houses; marriage and divorce records; and birth and death certificates. One component, the AIRNow-I project (*kōngqì zhìliàng rìbào yùbào*), which began in 2010, provides information on air quality (a major concern in Chinese cities) and allows citizens to upload data via mobile phones, a form of citizen science. It was soon emulated by other cities in the Yangtze River Delta region. Shanghai has succeeded in other realms as well: Shanghai Medical University is China's leader in telemedicine.

Shanghai's e-government caught the eye of the government in Beijing and became a model for the rest of the country; at the urging of the central government, its system was designed to be replicable in other contexts. As a result, its social security administration system is being emulated throughout large parts of China. The city has provided guidance and expertise for several other provinces and metropolitan areas through collaborative agreements. In the process, Shanghai's model has been gradually altered to reflect technological changes and the diffusion of skills among the population, which enables them to use it.

Beijing, a sprawling metropolis of roughly 12 million people and the nation's capital, got an early start in e-government. It was the first Chinese city to initiate an online office work system for public employees. In 1999, it fostered the Digital Beijing project, including the Capital Public Information Platform (*Shoudu Gongyong Xinxì Pingtai*), which offers access to databases about population, traffic flows, and public offices, and allows civil service examinations to be taken online. The Zhongguancun Park of Science and Technology, which began in 2000 in northwest Beijing and grew to include 6000 corporate tenants, streamlined its administrative procedures through its Haidian Digital Park, through which firms can file statistics, taxes, and financial reports through a "one-stop shop" portal. As a result, turnaround times for government approval dropped from 2–3 months to 10–15 days (Zhang, 2002). The city's Municipal's Public Security Bureau launched online ID (*shen fèn zheng*) applications for its residents. It also established the Beijing Municipal Public Security Comprehensive Digital Broadband Network Project largely aimed at integrating the voice, data, and video surveillance systems. The Beijing Administration for Industry and Commerce uses an online service platform named Red Shield 315 to offer 20 tax application forms online, as well as forms for registration and annual inspections, corporate identification verification, new Internet business approval, and domain name registrations. Such projects aim to lure investors by making it easy to complete the necessary forms and navigate the often Byzantine bureaucracy of the Chinese state. On days of extreme air pollution or flood possibility, the police department government uses Weibo to notify residents under the Safe Beijing program (Rubenstein, 2012).

Tianjin (population 1.1 million) has enjoyed successful e-government implementation as well, with 600 public sector functions online. A high-speed broadband network links the majority of the city's people. A Distance Tax Collection System allows taxpayers to check their accounts. The Port Information System expedites customs clearances for ships' cargos in Tianjin's port. Its Digital City industrial park has attracted a cluster of software and biotechnology companies. The Tianjin Binhai New Area combines the port, industrial, and free trade zones and offers numerous educational programs.

The Shenzhen metropolis, with a population of 10 million in 2015, is the rapidly growing capital of Guangdong and a vital economic hub of the Chinese economy. It adopted e-government several years after other large cities in China had already begun the process (Tan et al., 2013). A major center of trade and FDI, Shenzhen, developed systems for online administrative approval, corporate registration, tax collection, and community services. The city's Municipal Land Administration Bureau posts land use classifications and applications online. As Ma et al. (2005, p. 30) notes, "E-government in Shenzhen focused on the projects such as the online official approval system (*Wangshang Shenpi Xitong*), electronic tax declarations (*Diazi Baoshui Xitong*), online company registration (*Wangshang Zhuze*), and community information services (*Shequ Xinxi Fuwu*)."

The municipal government connected 88 public offices and departments with intranets and wireless data networks.

Nanha, in the Pearl River Delta, developed a Government Network System of fiber-optic lines that connect the public with the offices of public safety, family planning, electricity distribution, taxation, weather forecasting, services for the elderly, public procurements and construction projects, and land auctions. Nanhai's system is regarded as one of the most successful in China, despite resistance from middle managers (Luo, 2009): Beijing heralded it as an "E-government Model City." The local state used e-government to streamline its bureaucracy, merging several agencies and flattening its administrative structure. The municipality established the City Administrative Services Centre, which centralized 22 public services (e.g., registrations, tax collections), which reduced administrative costs and improved interoffice interactions.

Chengdu, the capital of Sichuan, has built a unified "smart city" e-government platform utilizing the city's cloud computing center. It offers a variety of social services and emergency notifications, and has been deployed to monitor hazardous chemical spills, traffic control and accident detection, trace tainted foods, and observe groundwater levels and quality. Government service centers use closed-circuit television (CCTV) cameras to monitor employees with direct contact with the public to assess productivity and quality of service delivery (Schlaeger, 2013). Similarly, the police use a CCTV system called Skynet to monitor streets.

Other local and provincial examples abound. The government of Guangdong province moved aggressively into online records, contracts, and signatures. The city of Xian offers online tax reporting, payments, and tax statements. Nanjing, the capital of Jiangsu province, started Digital Nanjing; the Nanjing Public Safety Bureau posts service standards, procedures, and prices online, as well as phone numbers for claims and complaints. Ningbo offers online approval for permanent residency under the *hukou* system, reducing waiting times from 40 to 15 days. Its official website, China Ningbo Web (*Zhongguo Ningbo Wang*), launched in May 2001, largely carried news from the municipal Party propaganda department and the newspaper *Ningbo Daily* (Zhang, 2002). Suichang County, in Zhejiang Province, established a rural e-commerce portal to encourage local farmers and artisans to sell their goods online. Korla, in Xinjiang or the Uyghur Autonomous region, implemented a Smart Korla Development Master Plan, an unusual case of successful e-government in the country's periphery.

The national government's annual *Chinese Government Website Performance Assessment Report* monitors the effectiveness of municipal websites in terms of their transparency, effectiveness, and service provision. Shi (2006), however, found serious problems in accessibility to e-government websites there, and many are not updated regularly. Many Chinese are simply unaware of the existence of e-government webpages or their usefulness (Xiong, 2006). Zhao et al. (2015) examined numerous public webpages to assess their transparency and found that most simply provided information; only a small minority offered interactive capabilities.

Finally, many Chinese cities have turned to social media to disseminate information (Zheng, 2013; Buyong and Shaoyu, 2014). For example, many local police departments use Twitter and microblogs, which have become important avenues for communications between the state and citizens (Ma, 2013). Local propaganda agencies use them to monitor public opinion and as mouthpieces to encourage support for the state. As Schlaeger (2013) points out, information about the government is not the sole property of the government itself. Many Chinese discuss issues of local governance on chat rooms, microblogs, and bulletin board systems. The potential of these venues to undermine the state's monopoly over information is considerable, although given how fastidiously the Chinese government monitors its own people, there are considerable risks to expressing dissident opinions. Conversely, social media allow people to provide information to the state: citizens have used social media to report outbreaks of SARS, children killed in earthquakes, and instances of contaminated milk (Yongnian and Wu, 2005).

After the Sina Corporation started SinaWeibo in 2009, local governments began to use microblogs enthusiastically: by 2013, there were more than 176,000, one-third of which were run by security agencies. The Yunnan provincial government was the first to adopt microblogging, in 2009. Schlaeger and Min (2014) analyzed numerous government microblogs to explore whether they offered opportunities to encourage reforms or reinforce the existing political status quo, and concluded that they serve as spaces of experimentation for improving both governance and government control, including managing social conflicts. They note (p. 190) "that research on Chinese state-netizen relations tends to emphasize confrontation while the more mundane and conciliatory use of social media by local governments in Chinese netizens' everyday life is often downplayed or trivialized."

3.1.3 Obstacles to Chinese e-government

China's deeply centralized political system presents serious obstacles to the successful implementation of e-government initiatives, including conflicting priorities, poor interagency communications, and offices with bloated staff numbers. In a sense, e-government tests, and sometimes ruptures, the bounds of China's old cadre system (Liou, 2007). State secrecy laws are often woefully out of date and irrelevant for the modern, rational administrative systems that e-government fosters. Fears of the Internet's political potential loom in the background: Hachigian (2001, p. 118) notes that the Communist Party has long been concerned about "how to prevent this commercial gold mine from becoming political quicksand." Luk (2013) points to several

obstacles to e-government adoption in China, including an overly skeptical attitude of government officials toward information technology and the lack of sufficient financial resources and technical skills. E-government is an abrupt departure from traditional ways of conducting governance, and thus is not always welcomed by those who fear they have something to lose. China's conservative administrative structure has changed little as a result of e-government. This leads municipal authorities sometimes to supply the government in Beijing with false data. Ma et al. (2005, p. 24) argue

As a consequence of a deeply centralized and often inefficient management system, China has faced critical problems including bloated administrative structures, overstaffing, confusion between government and enterprise management, and the often unhelpful intervention of the central government in the economy. Contradictions arose and became ever more significant as administrative reform lagged behind economic reform.

Similarly, Holliday and Yep (2005, p. 243) argue that "Perhaps the largest constraint on the development of e-government in China is that while it entails new modes of service delivery and information dissemination, it also goes beyond that, requiring a recasting of the mindset of the Chinese bureaucrats." Such comments illustrate that simply introducing web-based technology is not enough: e-government necessitates organizational change, as well as new outlooks and culture. E-government is decidedly as much political in nature as it is technical.

As Gao et al. (2013) note, despite its history of centralized planning, China's e-government system is quite fragmented. Rather than an undifferentiated whole, it is more realistic to view the state as a galaxy of agencies and offices with competing demands. Control over the Internet rests in the hands of a dozen different authorities. Turf battles among different ministries, each of which views the Internet as its exclusive domain, have led to struggles over budgets and hampered the formation of well-coordinated policies. For example, the Xinhua news agency and the China International Travel Services have battled over the revenues from international firms such as Reuters. The State Administrative of Radio, Film, and Television and China Telecomm sustained conflicts over the development of broadband cable services, and the resulting revenues. Conversely, e-government does not only reflect, but also affects, the government's administrative structure (Liou, 2007).

Kluver (2015) notes that e-government is a technical solution to problems that are deeply social, institutional, political, and cultural in nature. For example, while Golden Tax certainly reduced tax fraud and enhanced public revenues, it barely put a dent in China's massive tax evasion, which is nearly universal and reflects norms that hold that taxes are inherently illegitimate. The Chinese state suffers from a credibility gap and widespread mistrust, and no digital system can rectify that problem.

Other problems persist. Public awareness of and participation in e-government programs remains low (Shao et al., 2015). Many municipal governments lack the financial resources to purchase adequate computers and networking equipment. Often, personnel in government offices lack the technical skills necessary to establish and maintain web-based systems. Implementation schemes frequently run over budget and behind schedule. Different agencies often have different objectives and priorities

in this regard (Zhang et al., 2015). Finally, e-government networks, like all Internet-based ones, are vulnerable to hacking and fake information. Despite its investments in information technology, China's information technology (IT) infrastructure is underdeveloped and unequal. Broadband diffusion lags behind other Asian countries, and connection speeds are often painfully slow: in 2016, China's Internet speed ranked 91st in the world, with an average broadband connection of 9.46 megabits per second (Wong, 2016).

There is a large literature on the diffusion of information technology in China and the country's digital divide (cf. Hughes and Wacker, 2003; Song, 2008; Chen et al., 2010), which takes several forms. The most serious is between wealthy urban areas and impoverished rural ones (Fong, 2009). A second manifestation is that between the prosperous southern and eastern coast and lagging northern and eastern inland provinces (Tang, 2000), a division exacerbated by the country's globalization. A third form is differentiation among villages and stratification among the peasantry (Guo and Chen, 2011). Even the quality of government websites varies geographically, with those in the interior generally less sophisticated and interactive than those on the coasts (Zhao, 2004). The country's social and spatial inequalities are thus replicated in cyberspace. Social inequalities in Internet access and use are also persistent. As in most countries, Chinese netizens tend to be young; the elderly are often unaware or are intimidated by digital technologies.

The Chinese state has sought to increase Internet access in remote rural areas (Harwit, 2004; Chen and Lai, 2010) and has promoted the mobile Internet there (Loo and Ngan, 2012). Key to this effort is the Village Access Project (Xia and Lu, 2008), which began in 2004 to provide telephony in rural areas. Many migrants to urban areas, whose numbers may exceed 100 million, particularly those without *hukou* permits to live there, lack Internet access or literacy in information technology and thus cannot utilize e-government services (Wang and Chen, 2012). However, some Chinese planners see e-government as a means of decreasing the urban-rural divide as the Internet spreads into remote villages, including electronic classrooms. As Mo et al. (2013) point out, the One Laptop per Child program has helped to provide computer skills to disadvantaged children of rural migrants. With funding from the United Nations Development Program, the Ministry of Science and Technology funded a series of rural telecenters in rural Wu'an (Soriano, 2007; Zhang, 2007). Sichuan addressed the issue with a public-private partnership that portrayed serving the unprofitable rural market as a civic duty for telecommunications carriers (Liu, 2012, 2016). And, as Rubenstein (2012) notes, "In 2010, the Ministry of Agriculture began an outreach program aimed at rural farmers that distributes information on weather, drought, and agricultural science via text message." But the problems of rural informatization are severe and persistent (Qiang et al., 2009; Oreglia, 2014), with low incomes and rates of computer literacy.

To some extent, the digital divide is mitigated by the widespread use of mobile phones (Loo and Ngan, 2012), which have become affordable for the vast majority of the population. Particularly popular is Little Smart, or *xiaolingtong*, a low-end, inexpensive mobile phone service that operates only within one city in which the user is registered (Cartier et al., 2005).

Indeed, the Chinese state has never paid much attention to the needs of the “information have-nots” or “have-less” (Cartier et al., 2005; Qiu, 2009). It has not encouraged the growth of cybercafes, which in many countries form a primary segueway into cyberspace for those unable to afford a personal computer, although more than 1,100,000 exist in the country. Its obsession with political control does not help: many e-government services are provided through one-stop-shop government affairs service centers (*zhengwu fuwu zhongxin*) monitored by security cameras, which inhibit use.

3.1.4 Chinese Internet censorship

It should, of course, be recalled that China is among the most severe Internet censors in the world (Warf, 2010). Indeed, the government manifests a clear paranoia about the liberatory power of the Internet, which may give the population access to information other than that controlled by the state. Fear of the state leads to widespread self-censorship. The government, the world’s largest and most corrupt kleptocracy, leaves nothing to chance, however.

The government deploys a vast array of measures collectively but informally known as the “Great Firewall,” which includes publicly employed monitors and citizen volunteers, screens blogs, and email messages for potential threats to the established political order. There are numerous components to the Great Firewall that operate with varying degrees of effectiveness. International Internet connections to China are squeezed through a selected group of state-controlled backbone networks. Popular access to many common web services, such as Google and Yahoo!, is heavily restricted (MacKinnon, 2008; Paltemaa and Vuori, 2009). The national government hires armies of low-paid commentators, commonly called by the derogatory term the “five-mao party,” to monitor blogs and chat rooms, inserting comments that “spin” issues in a light favorable to the Chinese state. Some municipal governments take censorship into their own hands: Beijing, for example, uses 10,000 volunteer Internet monitors (Wines, 2010). However, a large share of censorship occurs via Internet companies themselves (MacKinnon, 2008), which monitor chat rooms, blogs, networking services, search engines, and video sites for politically sensitive material to conform to government restrictions. Websites that help users circumvent censorship like anonymizer.com and proxify.com are prohibited. Users who attempt to access blocked sites are confronted by Jingjing and Chacha, two cartoon police officers who inform them that they are being monitored. Instant messaging and mobile phone text messaging services are heavily filtered, including a program called QQ, which is automatically installed on users’ computers to monitor communications. Blogs critical of the government are frequently dismantled, although for the most part the government outsources this function to blog-hosting companies (MacKinnon, 2008). In 2006, for example, Microsoft’s MSN Spaces blog-hosting site agreed to conform to government “guidelines” in return for freedom from censorship at the ISP level. In June, 2009, the government attempt to require manufacturers to install filtering software known as Green Dam Youth Escort on all new computers, but retreated in the face of a massive popular and corporate outcry; a lawsuit from a California firm, Cybersitter, alleging that China stole its software (Crovitz, 2010); and the fact that Green Dam

inadvertently jammed government computers (Lake, 2009). In response, Falun Gong released a program to circumvent it called Green Tsunami.

The Great Firewall system began in 2006 under an initiative known as the “Golden Shield,” a national surveillance network that China developed with the aid of US companies Nortel and Cisco Systems (Lake, 2009) and extended beyond the Internet to include digital identification cards with microchips containing personal data that allow the state to recognize faces and voices of its 1.3 billion plus inhabitants. The envy of authoritarian governments worldwide, the Golden Shield has been exported to Cuba, Iran, and Belarus. Indeed, in many respects, China’s state-led program of Internet development serves as a model for other authoritarian governments elsewhere.

The Chinese government has periodically initiated shutdowns of data centers housing servers for websites and online bulletin boards, disrupting use for millions. Email services like Gmail and Hotmail are frequently jammed; before the 2008 Olympics, Facebook sites of critics were blocked. In 2007, the State Administration of Radio, Film, and Television mandated that all video sharing sites must be state owned. Police frequently patrol Internet cafes, where users must supply personal information to log on, while website administrators are legally required to hire censors popularly known as “cleaning ladies” or “big mamas” (Kalathil and Boas, 2003).

At times government censorship can generate problems with foreign investors. The government for years blocked access to *The New York Times*, until its editors complained directly to President Jiang Zemin, but left the website for *USA Today* unmolested (Hachigian, 2002). In the Chinese case, Google, the world’s largest single provider of free Internet services, famously established a separate, politically correct (by China’s government standards) website, Google.cn, which censors itself to comply with restrictions demanded by the Chinese state, arguing that the provision of incomplete, censored information was better than none at all (Dann and Haddow, 2008). In early 2010, responding to the ensuing international criticism, Google announced it would no longer cooperate with Chinese Internet authorities and withdrew from China. Untroubled, the Chinese government promotes its home-grown search engines such as Baidu, Sohu, and [Sina.com](http://www.sina.com), which present few such difficulties.

Finally, the Chinese state has arrested and detained several Internet users who ventured into politically sensitive areas. Although it cannot monitor all websites in the countries, the state pursues the intimidation strategy popularly known as “killing the chicken to scare the monkeys” (Harwit and Clark, 2001). *Reporters Without Borders* reported in 2008 that China had incarcerated 49 cyberdissidents, the most in the world. For example, cyberjournalist Hu Jia, winner of the European Sakharov Prize for Freedom of Thought, was sentenced to 3½ years in prison in 2008 for “inciting subversion of state power.” Human rights activist Huang Qi received a similar sentence that same year for posting criticisms of the Sichuan earthquake relief efforts. Librarian Liu Jin received 3 years imprisonment for downloading information about the organization Falun Gong, which China treats as terrorists. China’s best known blogger, Zhou Shuguang, was prohibited from traveling to Germany to judge an international blogging competition. Others have been prosecuted for posting or downloading information about Tibetan independence, Taiwanese separatism, or the Tiananmen Square massacre. No avenue exists to repeal censorship decisions.

Such measures have helped to limit the use of the web by democracy and human rights advocates, Tibet separatists, and religious groups such as Falun Gong. They also help proactively to sway public opinion in favor of the state. However, given the polymorphous nature of the web, such restrictions eventually fail sooner or later. By accessing foreign proxy servers, a few intrepid Chinese netizens engage in *fanqiang*, or “scaling the wall” (Stone and Barboza, 2010). Using its programmers in the United States., Falun Gong has developed censorship-circumventing software called Freegate, which it has offered to dissidents elsewhere, particularly in Iran (Lake, 2009). Chinese censorship and its resistance thus form a continually changing front of strategies and tactics: As one Chinese blogger put it, “It is like a water flow – if you block one direction, it flows to other directions, or overflows” (quoted in James, 2009).

3.1.5 The People’s Republic in perspective

With the world’s largest population of netizens, e-government in China affects more people than anywhere else. The country exemplifies how e-government can succeed when it is powered by top-down initiatives, such as the multiple Golden projects and Government Online. China’s programs appear above all to be designed to encourage economic growth. Thus, front and center are efforts designed to facilitate the growth of e-commerce, including tariff and tax collection, promotion of FDI and tourism, financial management, and intellectual property. Such measures surely placate the middle class, an undertaking that their planners no doubt hoped would help to legitimize the rule of the Communist Party. There is a rich array of municipal and provincial e-government programs as well that touch on the lives of Chinese urbanites in many ways, including contact with police departments, tax declarations, telemedicine, and microblogs. China has done little to confront the digital divide and underserved rural areas; for example, it lacks a robust series of rural telecenters such as found in India. Finally, China is one of the world’s most aggressive censors of the Internet, testimony to the fear that the ruling party has widespread access to information not channeled through the state.

3.2 Hong Kong: the Fragrant Harbor excels

Hong Kong, long a British colony but under Chinese control since 1997, forms a Special Administrative Region in China, where the influence of Beijing is not as all-encompassing as in most Chinese cities. It is home to the world’s largest port, through which half of China’s trade passes, and is a major center of financial services. Wealthy, globalized, and technologically sophisticated, with roughly 7 million inhabitants, it is not surprising that Hong Kong has developed a formidable e-government system. More than 80% of its residents use the Internet, far more than China (52%), and mobile phone penetration stands at 125%, making m-government far more feasible than in the rest of China; for example, the government warned residents of the SARS epidemic through text messages, and agencies were held accountable for misreporting data (Mol, 2009).

Under the leadership of the Information Technology and Broadcasting Branch (ITTb), the city has positioned itself as a global leader in the use of information technology and is sometimes called the “world’s most wired city”. More than 90% of firms and households have broadband connections. Because it is officially part of China, the United Nations did not include Hong Kong in its e-government readiness survey. Nonetheless, it is a model of a comprehensive and well-integrated e-government system. The city was adept not only at using e-government to automate many state functions but also to restructure them and make them more user friendly, including for the business community (Holliday and Kwok, 2004), complementing rather than duplicating private sector efforts. For example, it offers information kiosks with Internet access in railroad stations, supermarkets, shopping malls, and government offices.

Policies to encourage the growth of e-government in Hong Kong proceeded through a series of Digital 21 Information Technology strategies at successive moments. The first, in 1998, sought to develop an electronic service delivery infrastructure. The second, in 2001, sought to move government services online. The third, in 2004, emphasized improving customer relations. Finally, the fourth, in 2008, sought to formulate citizen-centered modes of service delivery to encourage participation in e-government. A part of the Digital 21 Strategy included financial (e.g., cash rebates, fast-food coupons) and nonfinancial (e.g., priority and personalized services) incentives to users who make use of certain online services.

Hong Kong’s success in e-government is manifested in several ways. It initiated an Electronic Transactions Ordinance in 2000, paving the way for paperless government offices. The ITTB created an e-government coordination office to change bureaucratic cultures resistant to e-government, to provide technical help, and to provide guidelines for how to optimally disseminate information over the web. The e-government coordinator meets regularly with external consultants.

The city aims, and has largely succeeded, at being the world’s leader in e-commerce, much of which is facilitated by the government’s overtures to the business community. In 1998, it launched a 26-ha “cyberport” to lure high-tech firms with an incubator, advanced telecommunications links, hotel, conference center, media laboratory, and cyber library. The Electronic Transactions Ordinance, enacted in 2000, gives firms legal backing to digital signatures, and thus security to Internet commercial transactions. The Trade and Industry Department regularly courts firms and investors digitally, has offered EDI since 1997 for license and certificate of origin applications, and freely dispenses information about licenses, permits, approvals, and taxes. The Hong Kong Trade Development Council cybermarket matches businesses and provides contact information. The Virtual Small and Medium Enterprises Information Centre hosts a one-stop Website that seamlessly links government agencies and licensing authorities, trade and industry associations, and various professional bodies. The Business Advisory Service offers webinars on investment and running businesses. InvestHK, the agency charged with attracting local investment, answers questions, organizes online investment forums, and markets Hong Kong abroad, all performed only online. The city is also a model of e-procurement, or government purchases online (Gunasekaran and Ngai, 2008), making expenditures transparent and minimizing kickbacks. It is adept at e-stamping, or secure, Internet-based ways of paying duties to the

government (Luk, 2009). To assist small- and medium-sized enterprises, it erected an Information Technology Training and Development Centre to provide online training.

E-government services are also aimed at the population, i.e., G2C programs. Particularly notable is its electronic service delivery (ESDlife) initiative (Poon, 2002), a key part of the government's Digital 21 strategy, which began in 2002. ESDlife is an innovative joint venture between the state and the private sector, which makes the government a user rather than the owner. ESD life offers one-stop access (www.esdlife.com) to roughly 40 government services, including marriage registration, volunteer registration, reservations at leisure and sports facilities, and filing tax returns. It is used by 3 million people per month (Holliday and Kwok, 2004). Similarly, the Hong Kong Hospital Authority uses intranet to provide health information and booking services, clinical guidelines, a medical database, and training programs. Hong Kong residents are legally required to carry identification cards, whose information links to this system seamlessly. During the SARS outbreak, the government sent warning via text messages to 6 million people. The Drainage Services Department conducts inspections using mobile phones. The Hong Kong Police Force offers an online reporting center to report crimes. The city's judicial system offers online guides to the courts, including dockets. To address the city's digital divide, Hong Kong established the Community Cyber Point project, which offers Internet access in post offices, libraries, and community centers. Some of these include Braille and text-to-voice translation services. The traffic department, which operates a network of closed-circuit television cameras, allows people to check congestion levels online and calculate the most efficient path through its Route Advisory System.

3.3 Taiwan: the Republic of China leads the way

On the island of Taiwan, the government of the Republic of China has pursued an aggressively capitalist course, with US backing, since 1949. With 23.5 million people, Taiwan's export-oriented economy includes impressive industries in electronics, industrial machinery, and petrochemicals. As a country with a much higher per capita income than China, and a relatively democratic government, Taiwan has both the resources and the political context to implement e-government in a democratic fashion.

Taiwan's success in implementing e-government stands in sharp contrast to China. Its 2015, e-government readiness score was 0.82, not far behind Asia's leaders, South Korea and Singapore. Internet penetration in 2016 stood at almost 84%, and mobile smartphone usage is very high. Its e-participation score was 0.89 (higher than Japan's), the third highest in Asia (after South Korea and Singapore). In short, a well-educated, technologically savvy population made the country well primed for the introduction of e-government.

Taiwanese e-government unfolded legislatively in a very different context from that of the People's Republic. Unlike the highly secretive Chinese government, the government in Taiwan has passed a variety of Freedom of Information Acts, modeled on those in the United States, that facilitate the public's rights and opportunities to obtain data about their state. For example, in 2011, the Taipei municipal government established an open data portal (data.taipei.gov.tw), and by 2013 the national government followed suit (data.gov.tw).

With roots that can be traced back to 1998, the Taiwanese e-government was rolled out in four phases: the first sought to disseminate information technology through public offices (a goal accomplished by 2002); the second aimed at shifting roughly 1500 services online; the third emphasized interoperability among various agencies; and the fourth, still under development, took as its goal the creation of a one-stop center or common platform (<http://www.gov.tw/>) that could address a variety of needs. All government agencies use electronic document storage and exchange.

The development of Taiwanese e-government was given its current institutional form through the Electronic Government Program, which was passed by the executive branch in April 2001 (Lee et al., 2005). It proceeded in several overlapping stages. Its origins, in 1998–2000, developed fiber backbones and electronic certification procedures. The second, in 2001–04, linked government agencies together. The third, 2002–07, moved 1500 services online. The fourth, 2008–11, sought to enhance citizen participation through Web 2.0 technologies. Taiwan's success in this regard is in part attributable to a centralized information system that crossed stubborn administrative boundaries (Yan et al., 2012). The country also placed considerable emphasis on e-government services accessible through mobile devices, or “m-government” (Hung et al., 2013). The Research, Development and Evaluation Commission of the Executive Yuan put a priority on making websites useful and accessible.

The best known example of Taiwanese e-government program is its online tax filing and payment system (Hung et al., 2006). It uses blogs to keep users up to date about changes in rules and regulations, and users can share tax-filing tips and experiences. Users of this system reported higher levels of satisfaction with the government than those still reliant on traditional forms of payment (Fu et al., 2004). In addition, to protect Taiwanese business executives operating in China, the government has expedited the use of online contracts (Liao and Jeng, 2005). Other applications include online automobile registration, job-matching sites, electronic procurement of contracts, access to tariff applications, and utility services. The government's Certification Authority assures quality control.

Information security is another important aspect of Taiwan's e-government, mandated by the Executive Yuan (Huang and Farn, 2016), including security audits, protection of vulnerable databases, feedback and adjustment protocols, and safeguards for critical elements of the information infrastructure. Local tax bureaus oversee the construction of backup systems. This system also contains guarantees for the protection of personal data.

Because citizen involvement is essential to good e-government, Taiwan has opened digital channels for residents to voice their opinions and complaints. The mayor of Taipei, for example, has a special email system for this purpose, although his office is cognizant that the digital divide limits this avenue to those with Internet access (Chen et al., 2006). Indeed, the wide variations in adoption of e-government tools among the country's national and local governments reveal an intragovernmental “digital divide” (Chen et al., 2006). Some locales have excelled: for example, Taoyuan County undertook U-Taoyuan, a large e-government initiative that provides comprehensive services to the local aviation and logistics industry. The county government uses RSS feeds to disseminate updates and promote new services; mashups offer essential information to targeted communities. Blogs and discussion for a new facility involve the local community, and the government provides updates through RSS feeds.

Although it is a relatively small country, nonetheless, geographic variations in Internet access and the quality of e-government exist in Taiwan. Hsieh et al. (2013) found that e-government was most accessible and widely used in the northernmost and southernmost parts of the island, i.e., the cities of Taipei and Kaohsiung. More remote regions, in contrast, offered fewer of the most popular e-government services. The government is well aware of the digital divide there and has taken active steps to mitigate it (Yu and Wang, 2004).

Several Taiwanese cities and counties have taken steps to introduce e-government in various ways. Changhua County implemented a fiber optic system and offers free instruction on the Internet to tens of thousands of residents. Hsinchu City, with a science park that employs 150,000 people, was the first in Taiwan to implement e-learning platforms—the e-Book Schoolbag and e-Book Reader. Its Intelligent City Project Office produced a local smart card that allows residents to ride busses, check out library books, and pay parking fees. Kaohsiung took the lead in implementing 4G mobile phone applications for e-government, including virtual tours of its arts center. Each head of its 891 neighborhoods is trained in using social media to alert residents to emergencies and promote conservation. New Taipei City has universal broadband access and 10,000 Wi-Fi hotspots. A cloud-computing development called U-Town has attracted 2300 businesses and created 80,000 jobs. Yunlin County uses public blogs to connect agricultural producers with one another, where they share farming techniques and solutions to problems. Taipei has a CyberCity program, including an electronic document system open to the public, e-schools, and more than 400 e-government applications. Free Internet kiosks were established at 800 convenience stores. An e-health care initiative has integrated the data systems of 300 municipal hospitals. Taitung County created a real-time decision support system that examines previous typhoons to help predict incoming storms. Taoyuan created Digital Opportunity Centers in remote areas and uses networked sensors to detect air and water pollution violations. In short, municipal e-government in Taiwan exhibits a wide variety of innovative and successful programs.

3.4 Conclusion

Greater China—the People's Republic, Hong Kong, and Taiwan—illustrates two sharply divergent paths to e-government. The People's Republic of China has largely harnessed it for purposes of promoting economic growth, state surveillance, and legitimating the Communist Party, forming one of the world's worst digital panopticons. It is notable how little of China's e-government is concerned to make the process citizen centric. Opportunities for feedback are limited, and the state heavily censors the Internet. In contrast, Hong Kong and Taiwan, have deployed IT to enhance the quality of people's lives, making them safer and more convenient. Such sharp differences testify to the deeply political nature of e-government and how it is entwined with relations of power: far from being some neutral technology, its uses everywhere are conditioned by local cultural, social, and political contexts.