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Multiple Research Perspectives in the Post-Informationization Age

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## 内 容 简 介

本书在对国际学术领域电子政务研究文献进行广泛扫描、总结和提炼的基础上，运用定性、定量相结合的规范性实证研究方法，从个人视角、组织视角、文化影响、政策环境等多个角度围绕电子政务采纳这一核心问题展开研究，试图更全面地刻画中国基层政府部门电子政务采纳的现状与问题，并探究其背后的原因与解决路径。

本书适合高等院校公共管理相关专业的教师和研究生、政府部门的官员以及电子政务领域的相关研究人员阅读参考。



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# Preface

As science and technology keep developing rapidly, electronic government (e-government) has received far-ranging attention and standing investment from most countries all over the world during the past two decades. On the other hand, the research topics of IT adoption and utilization have created an important stream in the academic fields of management information systems. Since the new century, IT/IS application in China has been even accelerating, especially when e-government systems are concerned. The IT/IS development gap between Chinese governmental organizations and those in the developed countries has been narrowed considerably. When informationization strengthens the infrastructure of e-government, the weaknesses in IT/IS adoption and utilization are also exposed. Since research that probes into e-government adoption in China is still scarce, exploring the e-government adoption and strategies in the context of the post-informationization age is important to both academia and practitioner.

Base on a broad investigation and a critical review on the abundant literature of e-government research, using both qualitative and quantitative empirical research methods, this book discusses e-government adoption issues from individual, organizational, cultural and institutional perspectives for interpreting the statuses of e-government adoption in Chinese local government more comprehensively, and understanding the key determinants more in-depth.

From the individual perspective, for exploring the determinants of e-government adoption in the Chinese cultural context, our study provides an IT adoption model based on Hofstede's cultural consequences theory and conducts an empirical test about an mobile government application in the municipal administration department of Beijing. From the organizational perspective, based on the technology-organization-environment (TOE) framework, our study describes the status and problems of open source software adoption in governmental organizations of Beijing from the perspectives on motivation, process and performance. In the subsequent chapter, we synthesize those two perspectives for explaining the bottleneck of e-government adoption. Centering on the administrative sanction service reform and its relevant e-government system, the chapter conveys the thoughts based on both the technology adoption framework and the structuration theory. Finally, focusing on the interactive relation between e-government adoption and ICT independent innovation, the book also provides a discussion on policy environment analysis and institution construction.

The findings of the book may help both scholars and government officers understand e-government application and management more comprehensively and deeply, as well as to better grasp the e-government adoption patterns, so as to design more effective strategies and plans for e-government development.

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Nan Zhang & Xunhua Guo

# About the Author

**Nan Zhang** is an Assistant Professor at the School of Public Policy and Management, Tsinghua University, and the Vice Director of the SPPM Electronic Government Laboratory. He received his Ph.D. in Management Science and Engineering from Tsinghua University. Dr. Zhang also has been a Visiting Scholar at RWTH Aachen University in Germany. His research interests focus on Electronic Government & Networked Governance, Public Generated Big Data & Policy Informatics, Smart City Theories & Practices, etc. He has published in journals including *Electronic Commerce Research, Information Systems Frontiers, International Journal of Mobile Communication, Journal of Global Information Management*, *Online Information Review*, etc. Dr. Zhang has been the project leader or key member for several research projects funded by National Natural Science Foundation of China as well National Social Science Foundation of China. He teaches such courses as Electronic Government, and Big Data Analysis, for graduate/MPA students.

**Xunhua Guo** received his Ph.D. from Tsinghua University and is currently an Associate Professor of information systems at the School of Economics and Management, Tsinghua University. His research interests include information systems adoption, IT and organizational changes, and business intelligence. He has published in journals including *Communications of the ACM, Information Systems Journal, Journal of Information Technology, Information Sciences, and Journal of Global Information Management*. He has also published six books in the area of information systems development and management. Dr. Guo has been principal investigator for several research and consulting projects. He is the Vice General-Secretary of China Association for Information Systems (CNAIS, The AIS China Chapter). He is on the editorial boards of several international journals, such as Journal of Global Information Management and Electronic Commerce Research and Applications. He teaches such courses as Management Information Systems, IT and Organizations, and Computer Networks, for undergraduate and graduate/MBA students.

# Contents

# 1 E-government Development and E-government Adoption in China

In terms of public administration and service, e-government is not been a new term. In the first decade of the 21th century, e-government has factually experienced significant development all around the world, which not only facilitates government reform and self-construction, but also promotes economic prosperity and social progress. The Chinese governmental organizations, in the most critical stage of industrialized, informationized and modernized development, is also depending on information technology to better perform their functions in economic growth, market development, social advancements, and public service. However, in the current post-informationization era, where the first upsurge of theoretical exploration and construction practice of e-government has receded, we are still unable to present satisfactory answers to issues that have occurred in the process of e-government development. In the periods of the 10th Five-Year Plan (2001–2005), the objective of promoting e-government was defined as to enhance administrative efficiency. After 2008, however, the objective was re-defined as strengthening social management and public service in the Report on the Work of China[①].

Such changes in service objectives and contents underlying e-government also display the new demands during the transitional period of service-oriented government. At this stance, this chapter briefly reviews the recent development of practice of e-government and attempts to analyze the new requirements and characteristics of e-government development in the post-informationization era. Based on the research logic and perspectives of information technology adoption related studies, the authors also propose the general research framework and make a brief introduction of the subsequent chapters of the book.

## 1.1 E-government Development Practice in China

Since the 1990s, the Chinese government at all levels starts successively to attach

① The term "electronic government" has been mentioned five times in the Report on the Work of China since 2002. In the 2002, 2003, and 2005 annual report, e-government development is one topic of the government development, while in the 2008 and 2012 annual report, it is one of the social development.

importance upon informationization[①]construction and gradually establish the leading position of information technology (IT) in sustainable development strategies. The development of informationization infrastructure and information industry in China has achieved initial success over the decades. According to the statistics from China Internet Information Center (CNNIC 2013), as of December 2012, the number of Chinese netizens has increased to 0.564 billion accounting for 42.1% of the population in the whole country, among which cellphone netizens reach 0.42 billion with an increasement of 0.064 billion as compared to the end of 2011 and its growing rate reaches 18.1%. The declining service costs and improving infrastructure lay a solid foundation for further boosting informationization construction. At the same time, the information technology industry has become an important driving force for the Chinese economic growth, increasing by 2–3 time of Gross National Product (GNP) over the past decade. It accounts for above 15% of GDP. The Chinese transnational corporations rooted in IT industry, with Lenovo, Huawei and Zhongxing as the representative, have started to vie in the global market (The World Bank 2007).

On this background, e-government construction in China has recently achieved significant development. As an effective approach to build modern public service-oriented government (Zhong 2003), e-government is rapidly advanced among Chinese governments at all levels. Experiences of Three Gold Projects and Government Online Project have laid a solid foundation for the Chinese e-government construction which is heading into deep development (Wang & Wang 2004). The functional orientation of government websites has also started to transform from initial information distribution to information interaction, business process and personalized service (Lu et al. 2004). The achievements of e-government in China are gradually recognized by the international community. China has been rising during the past five years in the annual Worldwide e-government Readiness Rank issued by the United Nations (UN. 2005; 2008; 2010; Wang 2006). The research report conducted by Professor West from Brown University shows that China is one of the ten countries which have the rapidest development in e-government all around the world (West 2006).

① With extensive implications, "informationization" can not only refer to information technology / information system (IT/IS) development at a macro level, but also construction of IS application in a specific enterprise or organization at a micro level. The Chinese scholar Si-wei Cheng proposed the term "informationization" for the first time among international academic fields of MIS in the keynote speech of the 25th International Conference on Information Systems (ICIS) in 2004, which is initially accepted by overseas scholars.

With the launch of more "gold" projects[①] and improvement and application of the four big fundamental bases[②], the Chinese e-government construction will have a wider space for growth during the period of the "11th Five-Year Plan".

However, it is worth noting that underlying the rapid development, there are also a number of problems in the Chinese e-government construction. It is mainly reflected in emphasis of implementation and neglect of application and disjointing between system construction and department businesses and so on, including the following aspects (Ma 2002; Wang 2003).

There is a lack of overall planning. The phenomenon of "Big and Complete, Small and Comprehensive" exits to a varying degree in many e-government projects. There is a low use ratio of internet platforms, data centers, disaster tolerance sites and safety certificate centers which are built independently by many departments. The overlap of information networks gives rise to idleness and waste of equipments and systems. E-government work in some departments was not emphasized, prioritized and executed by stages, which hides high risks. Without ideologies of overall plan and scientific planning, the government agencies' aspiration for e-government seems to be a double-edged sword. On the contrary, the rushing construction wave is likely to bring damage to the development of e-government.

Repeated construction is prominent. The issue of redundant building is supplementary to that of planning. The e-government development in China should not only focus on the construction of new projects, but also the integration and interconnection of the old systems. However, it is fairly easy to cause large-scale repeated construction as some departments fail to integrate existing systems and continue the construction of new projects, which highlights the accumulated problems. A thorough abandonment of logic for pursuing work

① The "gold" project is a general designation of a series of key informationization projects predominated by the central government, involving a wide range of business areas. It includes "Three Gold Projects" at the preliminary stage, such as foreign trade business information networks system (Golden Gate Project), state economy information networks system (Golden Bridge Project), uniform payment system (Golden Card Project), informationization reform for main economic practices involving national macroeconomic regulation and control aiming at applying information networks to accelerate reform (Macroeconomics System), revenue (Golden Tax Project) and fiscal administration (Golden Finance) and related measures strengthening IT application taken by key departments including Ministry of Agriculture (Golden Agriculture Project), State Auditing Administration (Golden Auditing), Bureau of Quality Supervision (Golden Quality), Ministry of Labor and Social Security (Golden Security), Ministry of Public Security (Golden Shield Project) and Ministry of Water Resources (Golden Water Project).

② Four big fundamental bases refers to four basic information data bases managing and protecting the national economy and people's livelihood constructed during the period of the "10th Five-Year Plan", which includes basic information base of natural resources and geographic space, population, legal entity and macroeconomic data.

performance and Image Projects and starting with business requirements constitute a foundation to address the issues.

Information islands abound. The departmental barriers caused by China's traditional administrative management system of Segmentation of Trap and Block restrict the idea of overall situation in the construction of e-government among numerous departments. Information islands are generated one after another due to the closed building model by which information sharing and interoperability are not taken into account. By virtue of e-government construction, some areas and agencies protect vested interest, consolidate administrative power, expand administrative functions and establish administrative separatism by creating Information Islands, which results in more functional overlap and interest conflict.

There is a long way to go for integration between information technology and operation. Although a majority of people have accepted the idea that the pivotal issue of e-government construction lies in "government" rather than "electronic", the disconnection between information systems and government processes exists prevalently in actual operations. As e-government develops, information technology can currently better support the governmental office automation in most regions and departments. But how to step further to realize IT's deep penetration into operation or even Business Process Reengineering (BPR) based on IT transform constitutes a critical issue perplexing government informationization departments.

The issues above exist to varying degrees in the development of the Chinese e-government, which so far has not been thoroughly addressed in a real sense. Nowadays, as our e-government infrastructure increasingly improves, the damage of issues becomes prominent. The problems are likely to become a bottleneck impeding the further development of our e-government construction if the methods are unavailable. As illustrated in the evaluation report by the World Bank, the international community is amazed at China's informationalization development speed in terms of its investment and construction, but overall evaluations on application indicate that there is still a long way to go for China's informationalization (The World Bank 2007). Therefore, it is imperative to understand the overall situation in an objective and comprehensive manner, take the problems seriously and seek countermeasures. By doing so, the Chinese e-government construction can have a brighter future.

## 1.2 E-goverment Development Stage and Characteristics of Post-Informationization Era

Currently, achievements and perplex coexist in the Chinese e-government development. With such a background, to analyze deeply numerous problems

occurred in the process of e-government development, it is imperative to evaluate accurately e-government development environment and levels. The vast territory of China and significant disparities between economic and cultural development levels among various regions give rise to unbalance of the e-government development. The neglect of these differences and sweeping analyses make it obviously difficult o hit the mark of the problems.

By speaking of the development stage of e-government, we have to mention the four stages model put forward by Layne and Lee (2001), which are important in the e-government research. In the model, e-government development is divided into four stages, namely cataloguing information, business information, longitudinal and horizontal integration as shown in Fig. 1.1, which is considered as a good description of e-government development progress and of tasks and characteristics in all stages (Anderson et al. 2006).

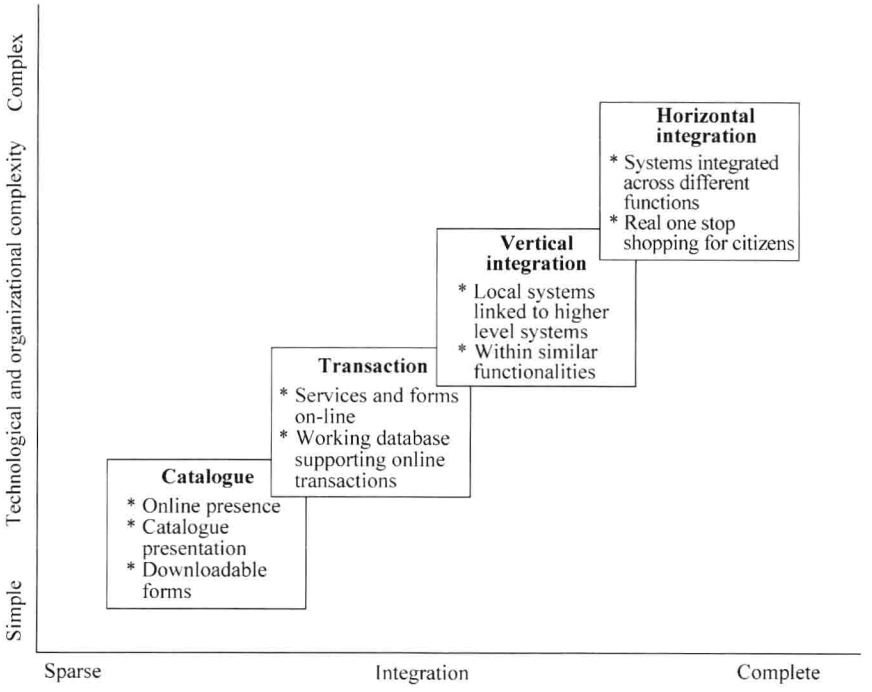


**Figure 1.1** Stage model of e-government development (Layne et al. 2001)

In fact, the stage theory and models are commonly adopted by researchers in analyzing IT adoption and diffusion or even innovation diffusion in a broader sense (Rogers 1995; 2003). In discussing innovation diffusion, the diffusion rate of innovation in organizations or society is considered uneven, which will change regularly with the readiness of innovation and fit with surrounding environments and can be depicted by S-Curve as shown in Fig. 1.2.

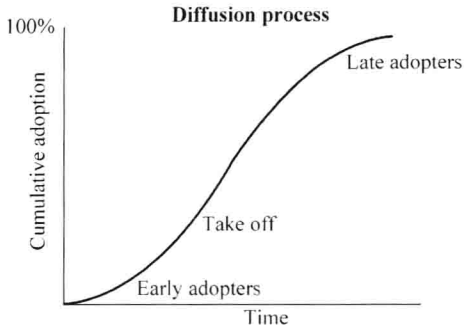


**Figure 1.2** Diffusion process of technology (Rogers 1995)

In the field of information system (IS) research, the significant stage theory founded by Professor Nolan from Harford University gives a similar expression (Nolan 1973; Guo et al. 2005; Guo 2005). In stage theory, it is recognized that to study and absorb IT requires time and practices of organizations. The process is described as a series of S-Curve, each of which can be divided into four stages. Each stage has its intrinsic characteristics in resource, management and application as indicated in Fig. 1.3. The stage Ⅰ (introduction) is mainly characterized by less investment in IT and limited and tentative IT application, whose aim is to validate the value and significance of technology to organizations. The prompt lifting part of S-Curve reflects rapid diffusion of IT in organizations, which is the stage Ⅱ (transmission). Eventually, the transmission approaches equilibration and the diffusion speed of IT declines to a controllable level. By now the growth process of IT turns into the stage Ⅲ (control). In the stage Ⅳ (integration), organizations have accumulated sufficient use experiences, grasped application forms of the mainstream technology,

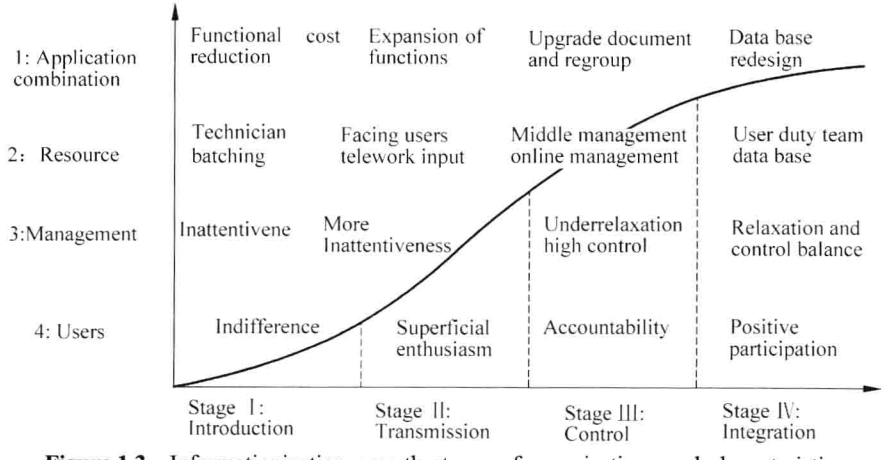


**Figure 1.3** Informationization growth stages of organizations and characteristics (Guo 2005, drawn based on Gibson and Nolan (1974))

achieved balance between managerial control and application development and made preparations for significant reform of technology application forms and next growth process, namely the next S-Curve.

E-government development in China can be correspondingly divided into four basic stages as follows.

**The initial stage (early 1980s–the late 1990s):** Office Automation (OA) projects launched in the central and local party and government organizations established various internal informational internets in longitudinal and horizontal directions. In 1993, information work leading group of the State Council laid down the Ninth Five-Year Plan for National Informationization and 2010 Prospect (Outline) in which the State Council claimed the former Ministry of Electronics vigorously coordinated with related Ministries. The startup project of national economy informationization, namely Three Gold Projects was thus officially initiated. The Three Gold Projects refers to Golden Bridge Project, Golden Gate Project and Golden Card Project. The projects, as the rudiment for the Chinese e-government development, are systematic ones featured with informationized government management and service which are led by the Chinese central government.

**The propulsion stage (1999–2001):** In January 1999, chief information offices from more than forty ministries jointly launched Government Online Project through which governmental information resources and application projects are provided, government sites with office automation and department functions closely connected. Thus the government sites become a window offering service for the convenience of the customers. Government functions are utilized to initiate industrial user online project, such as Enterprise Online Project and Family Online Project, making network penetrate into all walks of life and every household. Thus Cyber Society is formed in which information sharing and various social functions are realized through network.

**The development stage (2002–2006):** On December 26, 2001, National Informationization Leading Group in the first session made an important decision that the government should go ahead of the rest in establishing informationization. The Chinese president Jiang Zemin's Report at the 16th Party Congress pinpointed clearly that it is imperative to deepen administrative regime reform, further transform government functions, improve managerial methods, promote e-government, enhance administrative efficiency and reduce costs so as to form a public administration system featuring standardized behaviors, coordinated operation, fairness and transparency, honesty and high efficiency. Our informationized government management and service has made periodical achievements over the past two decades. A majority of government functional departments, such as Tax Administration, Bureau of Industry and Commerce, Customs and Public Security, have established private network covering the

whole system. Over 70% of the Prefectural-Level cities have opened service windows on the internet. There are more than 3,000 government websites.

**The post-informationization stage (from 2006 – present):** From a macroscopic perspective, the first three stages of the e-government development can be categorized into informationization age in which informationization infrastructure and application of technology approaches constitute the core of all practices. As e-government becomes increasingly mature and diversified applied problems in the existing e-government systems are revealed, authorities concerned started to transform their thinking from construction to application. At the end of 2005, the General Office of the CPC Central Committee and General Office of the State Council issued 2006–2020 National Informationization Developmental Strategy in which an application-oriented development goal was proposed. Hu Jintao's Report at the 17th Party Congress pointed out that we should promote e-government and strengthen social management and public service. The idea explained the objective and content of e-government and linked e-government development with service-oriented government construction.

What this study focuses is the fourth stage we now situate, namely the post-informationization era, in which e-government is confronted with the following transformations.

(1) Transformation from construction to application: As illustrated above, in the informationization age, our governments at all levels have invested a large number of human, material and financial resources, gradually improved informationization infrastructure, and created conditions for further development of e-government. While in the post-informationization era, the adoption and application of e-government system will deserve more concerns in the process of development.

(2) Transformation from the tool level to the process reengineering level: In the informationization era, IT is subsidiary to business. While in the post-informationization era, the situation becomes different. As a variety of government businesses are increasingly dependent on informationization approaches, e-government development is confronted with a predicament — that is, whether technology or business should be the leading actor. New business environment makes it imperative to promote process reengineering with e-government as the core.

(3) Transformation from environmental construction to social counterpart: In the informationization age, IT methods have steadily evolved from a tool of work environment or capability into a component of routine life or habits. Furthermore, in the post-informationization era, IT is omnipresent and the extension of e-government is expanding, which proves to be an effective approach to address a variety of public or tough social issues.