

# Socio-Technical Analysis of E-Government: A Case of Shenzhen in China

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## Abstract

E-government initiatives need to be understood as socio-technical systems (STS) that involve both use of ICTs and the reform of governance structures. This research applies the lens of STS to investigate e-government, based on a case study of Shenzhen. The study shows that the interactions between the Shenzhen Government's organisational reforms and technological innovations successfully transformed urban governance to be service-oriented, highly efficient and transparent. From this, the presentation argues that there needs to be a continuous fit between the social and technical subsystems in government. Addressing difficulties connected to the social subsystem will make it possible to realise desired changes in the technical subsystem and vice versa.

## Keywords

E-government, Socio-technical theory, Shenzhen

## 1. Introduction

Urbanisation and its related public management problems, such as low efficiency and bureaucracy, coupled with the Information and Communication Technology (ICT) Revolution, gave birth to the Electronic Government (E-Government) concept [1, 2]. E-government relies on ICTs, such as blockchain, big data, cloud computing [3], information infrastructure [4] and related software systems [5] to deliver public services [6, 7, 8]. The envisaged outcomes or the purposes of e-government are to make full use of ICTs to enhance government functions, to create a more efficient, streamlined, open and transparent government, and to provide better services for the public, enterprises and society [9-11]. E-government is not only simply to offer traditional government services online through ICTs but also to reorganise the government structure, reengineer operation processes of public sectors, and transform the culture of government [1, 2, 12]. So e-government calls for socio-technical balance in its developments, where new interactions between tasks, technology, structure, and people emerge.

This research aims at applying the lens of the socio-technical systems (STS) to investigate e-government. The research applies a case study of Shenzhen's local government that has successfully adopted e-government. The research addresses the following question: (1) How and to what extent do the social subsystem and technical subsystem interact in the e-government system in Shenzhen, China and (2) how and under what conditions does the joint optimisation realise during this process? The study aims to contribute to the e-government literature by applying STS to the e-government system, showing the interactions between the organisational innovations and technological innovations of the e-government system, exploring the joint optimisation of e-government, and proposing avenues from the socio-technical perspective to advance e-government.

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## 2. E-government and socio-technical theory

E-government also called Electronic Government, Digital Government, Electronic Governance, e-Gov and other similar names, emerged in the late 1990s in America [13]. Most definitions of e-government emphasise the use of ICTs as tools, but differences in the goals of e-government reflect the priorities in the government strategies. In general, the goals of e-government fall into three categories. The first category is to improve the governance process of the government, making it more efficient, transparent, and cost-effective; the second category is to provide more convenient services for citizens and enterprises and transform rigid bureaucracy into service-oriented governments; the third category is to change the relationships between the government and other stakeholders, such as promoting civic empowerment, providing greater opportunities for citizen participation for democracy, and building cooperative governments [1, 6, 7, 19, 21, 24, 27].

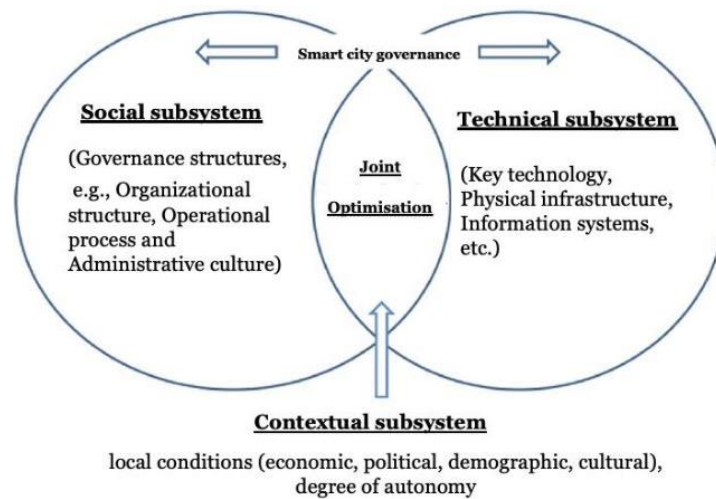
As a topic of transition studies, the majority of the e-government research analyses the traits of historical transitions and creates governance frameworks to direct the transition processes [14]. Several researchers have proposed some practical governance frameworks. Some of the governance frameworks are technical-driven, focusing on the role of ICTs e.g. big data [15, 16]. Other governance models focus on human and institutional factors, such as the role of governance structures, citizen-centric, social capital, human resources and stakeholders [17-20]. However, the challenges and failures in e-government practice are partly attributed to the lack of balanced attention to both technical and social aspects in the implementation [21], thereby leading to the introduction of multi-level perspective (MLP) and STS perspectives to the field of e-government.

While MLP is the most frequently adopted framework to understand the transition process [22-25], it suffers a drawback in that the hierarchical layers among niche, regime, and landscape are ambiguous [14]. Otherwise, this research uses practices as the analysis unit to focus on the horizontal view of transitions. STS theory advocates that the social and technical subsystems should be jointly optimised with considerations for the broader external subsystem. The social subsystem is concerned with the stakeholders' attributes, skills, attitudes, values, the relationships and interactions among stakeholders, reward systems, authority and organisational structures, while the technical subsystem focuses on the processes, tasks, and technology needed to transform inputs to outputs [26-28]. The STS theory could help to discover the causal mechanisms and contextual conditions of the transition process.

There are some proponents of socio-technical thinking in e-government implementation. For instance, Dawes [29, pp. 257] outlined an e-government framework that "reflected a dynamic socio-technical system encompassing interactions among societal trends, human elements, changing technology, information management, interaction and complexity, and the purpose and role of government". However, due to the holistic nature of this framework, the qualitative content analysis using this framework can hardly disclose the details of a case. Kompella [24, pp. 93] stated that e-government required "redefining organisational activities" and "interactions among wider stakeholders". However, the factor of governance structure had not been fully discussed. Bakunzibake et al. [21, pp. 53] investigated Rwanda and concluded the necessity of "a better fit between technical systems and social systems of organisations implementing e-government". Due to the huge differences between China and Rwanda, it might be productive for further research to explore this area in the Chinese context. Gao et al. [30, pp. 2] guided by the socio-technical theory, constructed the theoretical logic of e-government, which is "the result of the intersection of government operation value and goal and general digital transformation logic". The result emphasised the envisaged outcome of e-government and confirmed e-government will cause "the flow and interaction of elements such as the government's internal structure and processes" [30, pp. 4].

Empirical research in the context of China taking into account fundamental socio-technical factors is still limited. This research analyses the interactions of organisational structure, operational processes, and technology innovations in e-government in a Chinese case of a smart city. To guide the case study, from the STS perspective, this research proposes an analytical framework (Figure 1). The technical subsystem of e-government includes key technology, physical infrastructure, and information systems; the social subsystem consists of the government's organisational structure, operational process and administrative culture [31]; the contextual subsystem includes the degree of autonomy and local conditions. In addition, to discover the causal mechanisms, this analytical framework includes the

element of joint optimisation which suggests the envisaged outcomes of e-government due to the harmonisation and balance between the social and technical subsystems.



**Figure 1: Analytical Framework (Source: developed from [28])**

### 3. Methodology

A case study is a well-established research tool for examining the interconnections that exist between the many components and features of each case [32]. The reason for choosing Shenzhen as the study case is that Shenzhen is the typical vanguard of e-government in China. Shenzhen, a coastal city in southern China, has a geographical area of 1997 km<sup>2</sup> and a population of 17.68 million in 2021 [33]. In the 1980s, Shenzhen became a Special Economic Zone to serve as a trial run for China's reform and expansion [34]. Up to now, Shenzhen has progressed from being an underdeveloped village to a first-tier city, ranking alongside Beijing, Shanghai, and Guangzhou as well as being regarded as China's Silicon Valley. It is also considered China's smartest city [10, 35].

In March 2006, China's National Informatisation Steering Group officially issued the Overall Framework of National E-Government. This was a far-reaching document that established a new era of high investment and great development in China's e-government construction [36]. In August 2006, Shenzhen became the first e-government pilot city in China [37]. Shenzhen essentially reflects the latest perception of and approach to e-government in China, as a leader of China's e-government movement, and the so-called smartest Chinese city, in various e-government and smart city rankings, media reportage, and local government branding.

To investigate the phenomenon, the authors conducted online semi-structured interviews from April 2022 to March 2023 with 30 key informants including the leaders of the e-government projects, CEOs of related enterprises and residents in Shenzhen. Each interview lasted around 1 hour. All the interviews were recorded by smartphones after obtaining the interviewees' informed consent. In addition, the authors collected secondary data, including policy documents, online news and industry reports from September 2021 to March 2023 on the Baidu search engine. Searched phrases were Shenzhen, e-government, digital government, and smart city. Consequently, 370 documents regarding a series of organisational reforms and technological innovations were found to increase the reliability of the study by triangulation of data from different sources [38]. Coding was conducted under the guidance of the analytical framework in Figure 1 around the themes of 1) social subsystem, 2) technical subsystem, 3) contextual subsystem and 4) joint optimisation. The authors analysed the data using Corbin and Strauss's [39] methodology for a qualitative investigation. The analysis was performed to identify the socio-technical interactions in Shenzhen's e-government system.

### 4. Case description

E-government in Shenzhen is developed in three stages. The first stage is 2006-2008 when the e-government was just an up-and-coming state; the second stage is 2009-2017 when the e-government showed a burst and growth at an incredible rate in different government departments and agencies; the third stage is from 2018 up to now, where e-government entered the stage of resource coordination and top-level design.

#### **4.1. Stage 1: The birth of e-government**

In August 2006, Shenzhen became the first e-government pilot city in China [37]. In the aspect of physical infrastructure, the Shenzhen Government had built a unified e-government network (including intranet and extranet) for the whole city, which connected municipal and district supervision and command systems, as well as all relevant government departments [40]. The key technology in this stage was 3G and TD-LTE. In the aspect of information systems, the Shenzhen Government built an urban information resource exchange platform, which had become the hub of the city's information gathering, exchange, and sharing [41]. Based on resource sharing, the Shenzhen Government introduced the government online office system and the electronic document exchange system sought to establish an effective administrative office and employee management system, to stimulate the internal efficiency of the government and, to create a government-to-employee (G2E) e-government model [42]. As source D3 described: "Since the launch of the financial investment review management system, we no longer need to run around with a lot of paper materials which take a lot of time and effort. Now we use electronic formats, electronic documents, and electronic signatures in official activities and realise a paperless office." Finally, the Shenzhen Government built a unified e-government platform for the whole city. This predominantly included an online approval system, an online law enforcement feedback system, an online public services system, an online public resource transaction system, and an online supervision system. The city's unified e-government platform was the embodiment of the government-to-government (G2G) e-government model and sought to realise most traditional government affairs efficiently, effectively, and at a low cost, through the application of information technology [41].

#### **4.2. Stage 2: Expansion and scaling of e-government**

Building on the results of the e-government project, from May 2009, the Shenzhen government carried out an organisational reform to optimise the administrative approval process. This administrative approval process reform sought to break the boundaries between departments and used the online approval platform established in the e-government project to form joint approvals between departments and shorten the approval length [42-44]. By 2009, the e-government project of Shenzhen hardly developed the other two modes of e-government, namely, government-to-business (G2B) and government-to-citizen (G2C), due to the obstruction of the coordination and cooperation between various government departments. Therefore, the Shenzhen Government carried out an organisational innovation, government structure reform, which was officially launched on July 31, 2009 [45]. Firstly, the Shenzhen Government implemented the super-ministries reform that reduced the number of government departments from 46 to 31[45]. Then, the Shenzhen Government assigned 73 responsibilities clearly to the newly established 31 government departments [46]. Secondly, the Shenzhen Government separated the administrative powers of decision-making, execution and supervision by reorganising the departmental functions into 7 commissions, 18 executive bureaus and 6 offices [47]. Thirdly, the Shenzhen Government de-centralised around 284 administrative powers to streamline operations, as well as to focus on overall and macro-management [48].

After the 39-day implementation of the government structure reform, the government portal, Shenzhen Government Online (<http://www.sz.gov.cn/en/index.html>), could better serve as a one-stop service for citizens and enterprises [49]. This is the first fruition of the G2B and G2C modes of e-government, based on technological and organisational innovations. For example, under the previous arrangement, if a restaurant owner that is based in Nanshan District needs to register his/her business, they will be required to do so in various departments, including industry and commerce, and health.

However, with the help of the Shenzhen Government Online website, all the necessary administrative approvals can be obtained in a few days (Source: D2). In 2015, the Shenzhen Government cooperated with both Alibaba and Tencent to integrate the city service platforms into Alipay Wallet, Weibo, Mobile Taobao and WeChat platforms. Taking advantage of Alibaba and Tencent in connecting consumers in the Internet field, the Shenzhen Government could provide citizens with a series of urban services such as traffic violation inquiries, road conditions and bus inquiries, living bill payments, and hospital registration more quickly and conveniently [50].

The new challenge that emerged after divisional merging and administrative process restructuring was data silos effects, which was the biggest obstacle facing e-government. As source D12 described: "Data is the treasure of every department; the department that owns the data has confidence; no department is willing to share the data it collects". Therefore, in November 2012, the Shenzhen Electron Government Affairs Resource Centre was established, with the main task of managing the city's e-government infrastructure, government information resources and application platforms to promote interconnection, resource sharing, and efficient collaboration of the e-government project [51]. In October 2015, the Shenzhen Government issued the Administrative Measures for the Sharing of Government Information Resources in Shenzhen, which institutionally guaranteed the sharing of government information resources and further broke down data silos [52].

### **4.3. Stage 3: Sustainable development and top-level design of e-government**

In July 2018, the Shenzhen Government issued the Shenzhen Municipal New-Type Smart City Construction Master Plan, which proposed a three-tier smart city structure, including elements of platforms, systems, domains, operations, and supports to improve people's livelihood services and urban governance capabilities [53]. In January 2019, the Shenzhen Electron Government Affairs Resource Centre provided the unified government service mobile application, I-Shenzhen [54]. Specifically, Shenzhen citizens could enjoy services like 'I want to buy a house', 'I want to apply for medical insurance' and other scenario-based services on I-Shenzhen APP [54]. At the beginning of 2019, Huawei built a so-called City Brain for Shenzhen, which is a unified cloud governance platform that provided a unified service portal for society and provided online applications and business management for departments and agencies of the Shenzhen Government. The City Brain realised the connection between the municipal affairs cloud and the Guangdong province and districts, and realised resource sharing between the city and the districts. After integrating the city's information resources and platforms, the Shenzhen Government further made the government website and mobile application a one-stop public service platform for society [55].

With the rapid development of national e-government, higher requirements for the integration of information resources and top-level design between municipal governments and provincial governments or even central governments were put forward. Therefore, in January 2019, the Shenzhen Government began institutional reform. This reform first corresponded to the change of the central and provincial institutions, which also alleviated the challenges of the current situation, whereby it was impossible to locate a corresponding higher-level institution after the previous institutional reform in Shenzhen [56]. Secondly, the Government Services and Data Management Bureau of Shenzhen Municipality was established, which was responsible for coordinating the promotion of e-government and smart city construction [57]. Thirdly, this reform tried to coordinate the allocation of administrative law enforcement functions and law enforcement resources and promoted coordination and comprehensive law enforcement in the fields of market supervision, ecological environment protection, cultural market, transportation and other fields. Finally, the reform tried to promote the convenience of administrative approval services for citizens and enterprises.

At the same time, from 2018 onwards, the Shenzhen Government incorporated cloud computing, big data, blockchain and artificial intelligence (AI) technologies into the administrative approval system, which supports the automatic comparison of data, thereby showing the approval results in real-time and without any laborious interventions. In 2019, the Shenzhen Government initiated the first non-inductive declaration system, which allowed citizens and enterprises to provide less information or materials as well as spend less time in the administrative approval process [58]. The new administrative approval system was also a typical application of G2C and G2B e-government modes. It tried to help

in breaking the initial administrative barriers of government agencies and also help to reshape the structure of the government [59]. Hence, the Shenzhen Government rapidly transformed from being a regulatory government to a service-oriented government, based on organisational and technological innovations.

## 5. Findings and Discussion

Through the investigation of the development of e-government in Shenzhen over 18 years from 2006 to now, the research shows the interactions between the social subsystem and technical subsystem. Drawing upon the analytical framework in Figure 1, we dissect the process of e-government development in Shenzhen by stage. Table 2 summarised how the social subsystem, technical subsystem and contextual subsystem achieved joint optimisation. Several findings can be identified.

First, the development of Shenzhen's e-government could be divided into three stages and the social subsystem and technical subsystem interactions in the e-government system were different in the three stages. In the first stage, the social subsystem and technical subsystem interacted at a very low level. The birth of e-government focused on the innovation of the technical subsystem. The Shenzhen Government established basic e-government network infrastructure and e-government information systems, and the core technology at this stage was 3G and TD-LTE. As for the social subsystem in fact, the Shenzhen Government took the pilot launching of the super-ministries reform in China and realised the super-ministries system in the departments of culture, transportation, and urban management in 2004 [60]. After the reform came to an end, the number of relevant municipal departments was reduced from 42 to 35. But in the following five years, almost two new municipal departments were created every year. In 2009, when the super-ministries reform was fully launched, the number of municipal departments had been restored from 35 to 46 [61]. Moreover, the mechanism of mutual restraint and coordination of decision-making power, executive power, and supervisory power envisioned reform had never been implemented [62]. That was mainly due to the reform being radical, lacking corresponding top-level design, and being obstructed by vested interest groups. Because the social subsystem and technical subsystem did not evolve harmoniously at this stage, technological innovations transferred the governance processes online in limited scopes helping improve the work efficiency within the government to a limited extent.

In the second stage, the e-government showed a burst and growth at an incredible rate in different government departments and agencies. The social subsystem and technical subsystem interacted at a relatively high level. Technological innovations in the e-government project were resisted by civil servants due to cognitive and psychological inertia (D13, D14). Therefore, the Shenzhen Government promoted the diffusion of technological innovations through the reform of the administrative approval process. Furthermore, the Shenzhen Government initiated the most vigorous government structure reform since the reform and opening up, which inspired governance efficiency and transparency [63]. The super-ministries reform integrated the departments or institutions with similar functions, broke down the constraints of departmental separation and avoided the overlapping of government functions to improve administrative efficiency [64-66]. It provided institutional prerequisites by not only combining institutions but “restructuring government agencies around administrative business processes to realise the unity of government functions” (D10). For example, the Market Supervision Bureau, which was composed of the old Municipal Administration for Industry and Commerce, the Municipal Bureau of Quality and Technical Supervision, and the Municipal Intellectual Property Office, was in charge of market supervision, market access, commodities quality supervision, administrative law enforcement and external services, which were under the jurisdiction of different government departments [45]. Next, the reform established an operating mechanism in which the powers of decision-making, execution, and supervision simultaneously restricted and coordinated with one another. The reform was conducive to breaking up vested interest groups, avoiding power rent-seeking, and building a clean government. At last, the reform reduced administrative approval items, enhanced the service function and weakened the benefit function of the Shenzhen Government, which in turn strengthened the service-oriented administrative culture of the city. These reforms largely alleviated the social phenomenon of "government powers were departmentalised, departmental powers became profit channels, profit channels needed administrative approvals, and administrative approvals

were complicated" [67]. There were many reasons for its success, for example, the failed overture of the administrative three-division system in 2004, and the elimination of interest groups. In 2009, Shenzhen Mayor Xu Zongheng was sacked, and the new Mayor Wang Rong took office. One month later, the reforms began [68]. On the basis of government structure reform, e-government was rapidly launched in newly established departments. Each department was rapidly establishing its own e-government information systems. For example, Shenzhen Municipal Transportation Commission Shenzhen built a comprehensive transportation information exchange platform and six intelligent transportation systems including the public travel information service system, etc. [69]. Shenzhen Bureau of Housing and Urban-rural Development established an electronic bidding system, which enabled a scalable, transparent, fair, and competitive market [70].

The third stage of e-government entailed resource coordination and top-level design. The social subsystem and technical subsystem interacted at a high level. Due to the rapid proliferation of e-government projects, especially in the previous stage, various departments built their own e-government information systems, which resulted in vertical information islands, projects reconstruction and waste of resources. At the same time, the development level of e-government was unbalanced due to the different economic situations and leaderships of each department (Source: D9 ). Therefore, in the third stage, the Shenzhen government began to coordinate the city's e-government construction and strive to be upwardly compatible with the e-government resources and systems of the central government and Guangdong Province Government. The three-tier smart city structure and City Brain both embodied overall plan, coordination and linkage. The Shenzhen Government also promoted top-level design and overall construction through the innovation of the social subsystem. For example, the newly established Government Services and Data Management Bureau of Shenzhen Municipality was responsible for coordinating the promotion of the smart city and e-government construction. At this stage, the application of some key technologies, e.g. 5G, Internet of Things (IoT), AI and blockchain, has greatly promoted G2B and G2C e-government models. For example, in 2018, the Shenzhen Government launched the blockchain electronic invoice system which quickly became popular among many small and micro enterprises [71, 72].

Secondly, the joint optimisation of socio-technical interactions in Shenzhen depicts that the governance process is more efficient and transparent. It also depicts a more convenient service delivery for citizens and enterprises, as well as transforming rigid bureaucracy into a service-oriented government. However, the relationships between the government and other stakeholders did not seem to alter apparently. Although the Shenzhen Government tried to use technological innovation to reduce the cost of access to information and help the government to accept supervision, comments, and complaints from citizens. For example, the Shenzhen Government set up an online news release room to carry out various interactive communication services such as online comments, online petitions, online public hearings, and online investigations (Source: D4). It seemed that citizens lacked the motivation and confidence to participate in the management of urban affairs, as D6 explained: "I rarely complain and give any advice to the government because I don't feel it is necessary". Therefore, there is a necessity for more organisational reforms to promote civic empowerment, civic democracy and the building of cooperative governments.

The contextual subsystem has indeed influenced the socio-technical interactions. As the bridgehead of China's reform and opening up and the special economic zone, Shenzhen has a higher degree of autonomy than other cities. Shenzhen only needs to pay taxes to the central government and not to the Guangdong Provincial Government, which means that Shenzhen can retain more taxes to develop e-government (Source: D15). Next, Shenzhen always is the pilot city for social reforms and technical innovations, e.g. super-ministries reform in 2004 and 2009 and the e-government project in 2006. The flexible policy environment brings Shenzhen more opportunities and possibilities. Furthermore, regardless of the results of reforms and innovations, the Shenzhen Government has come under less political pressure (Source: D16). Thirdly, the average age of Shenzhen's permanent population is only 32.5 years old, making it the youngest city in the country [73]. Moreover, the Shenzhen Government is committed to improving citizens' information skills through mass media and offline activities, eliminating the digital divide, and helping citizens enjoy the fruits of informatisation [74]. So technological innovations are more likely to diffuse in Shenzhen based on the young population and high digital literacy of Shenzhen citizens. At the same time, there are many technological innovation companies in Shenzhen, such as Huawei, Ping An and Tencent, which can provide the technology

required for e-government to prosper [75]. Finally, as an immigrant city, Shenzhen has a small local population and is very inclusive. The Shenzhen Government also regards promoting the integration of the non-local population into Shenzhen as a basic city policy, strengthening humanistic care and education and training of the non-local population, and continuously improving the scope and content of public services [76]. As source D7 described: “The Shenzhen Government is a true public servant of the citizens with a nice service attitude. There are almost no locals in Shenzhen, so it is very open and inclusive. Some civil servants in the Guangzhou government still speak Cantonese, so they are more exclusive”. In view of the above characteristics of the contextual subsystem, the socio-technical interactions in Shenzhen are more successful.

The final finding is that the key to e-government development is to break down data islands. Although the Shenzhen Government established a unified device interface and compatible information systems. However, the phenomenon of administrative business chimneys and data silos persisted. Source D10 remarked: “A certain administrative business has been connected vertically between municipal and district governments; however, there are still barriers to connecting the cross-administrative business between different agencies and departments horizontally. This is more because of organisational barriers than technical barriers.” Therefore, the Shenzhen Government established the Shenzhen Electron Government Affairs Resource Centre and Government Services and Data Management Bureau of Shenzhen Municipality to promote information resource sharing and overall e-government planning respectively. Moreover, the interactions between the social subsystem and technical subsystem in the second stage showed that breaking down the data islands of government departments can promote the government to provide more convenient services to society. At the same time, the construction of the government's one-stop service system can force organisational reforms to promote the sharing of information resources among various departments. It could be seen that breaking the data silos requires the coordinated evolution of social and technical subsystems.

**Table 1**  
STS Perspective of E-Government Development in Shenzhen

	Stage 1: 2006-2008 E-government emergence	Stage 2: 2009-2017 E-government expansion and scaling	Stage 3: 2018-now E-government sustainable development and top-level design
Technical subsystem	<ul style="list-style-type: none"> <li>•TD-LTE, 3G</li> <li>•Government Intranet and extranet infrastructure</li> <li>•G2E: government online</li> <li>•office system and the electronic document exchange</li> <li>•G2G: urban information resource centre, information resource exchange platform, unified e-government platform</li> </ul>	<ul style="list-style-type: none"> <li>•4G, cloud computing, big data, mobile Internet</li> <li>•Network infrastructure, sensors, cloud server</li> <li>•G2C and G2B: one-stop government portal website</li> <li>•City service platforms on Alipay Wallet, Weibo, Mobile Taobao and WeChat platforms</li> </ul>	<ul style="list-style-type: none"> <li>•AI, 5G, IoT, blockchain</li> <li>•Government service mobile application, I-Shenzhen</li> <li>•Three-tier smart city structure</li> <li>•City Brain</li> </ul>
Social subsystem	<ul style="list-style-type: none"> <li>•Hardly changed</li> </ul>	<ul style="list-style-type: none"> <li>•Governance service orientation and information resource sharing through reorganising institutions and</li> </ul>	<ul style="list-style-type: none"> <li>•Improve resource integration through reorganising government institutions and launching new government agency</li> </ul>



		launching new government agency	•Promote the comprehensive law enforcement and examination and approval service convenience by publishing policy documents
		•Improve governance efficiency and transparency by changing the administrative approval process and operating mechanism	
		•Promote the sharing of information resources by publishing policy documents	
Level of interactions	•Low	•Relatively high	•High
Contextual subsystem	<ul style="list-style-type: none"> <li>•A high degree of autonomy</li> <li>•Flexible policy environment</li> <li>•Young citizens with high digital literacy</li> <li>• Many technological innovation companies</li> <li>•Inclusive urban environment</li> </ul>		
Joint optimisation	Inspiration for efficiency within the government	Efficiency, transparency and service-orientation of governance	Top-level design, resource integration and service-orientation of governance

## 6. Conclusion

E-government refers to a novel means by which public affairs can be streamlined, organised and managed, which should in turn lead to transformations in the structure of organisations and societies. Studies have demonstrated that an adequately implemented and managed e-government project can significantly reduce organisational bureaucracy by enhancing the value chain of procedures and services rendered to stakeholders. Through a case study of Shenzhen, this study shows that the interactions between the Shenzhen Government’s organisational reforms and technological innovations successfully promoted the urban governance process transforms to be service-oriented offering high efficiency and transparency. Hence, there needs to be a continuous fit between the social and technical subsystems in government. Addressing difficulties connected to the social subsystem will make it possible to realise desired changes in the technical subsystem and vice versa. Future research could investigate other interactions between social factors, such as stakeholders, and technical factors within the current case study and possibly others, so as to present a more holistic picture of the concept of e-government.

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