

Chapter 2

Measuring E-Governance Performance

2.1 Introduction

The potential of e-governance for improving internal efficiency and strengthening of interfaces with citizens is well recognized by governments across the globe. Its effective realization, however, demands overcoming of several challenges. These challenges generally relate to system and technology, processes, organizational issues, legal issues, security, citizen relationship management, inter-departmental collaboration and integration, building public-private partnerships, change management, etc. Of late, there has been a growing concern among several governments about low levels of acceptance of the e-governance services despite huge investments being made world-wide. On the other hand, while a large number of projects are finding it difficult to meet their intended purpose, the few successful projects amply demonstrate the benefits accruing to different stakeholders through effective use of ICT. The discouraging results pose a challenge to probe deeper into the performance aspects of these projects from the viewpoints of key stakeholders.

Most of the published literature on e-governance performance is based on qualitative analysis of specific contexts. Though, in the recent past, studies supported with empirical analysis are being regularly reported in e-governance literature, e-governance performance measures based on perspectives of key stakeholders belonging to different projects are generally lacking. In this chapter, we propose a construct and apply it for analysing e-governance performance from the viewpoints of government employees and end users in the context of the identified projects.

2.2 Key Stakeholders and Value from E-Governance

E-governance projects are generally characterized by involvement of a number of actors both internal and external to the owner organization. According to Freeman (1984, pp. 24–27, 52–55), it is important to account for key stakeholders while

pursuing for organizational objectives. Though there are many stakeholders associated with large e-governance projects, the prominent ones include employees in government organizations and the service users of government services which have been the focus of many scholarly studies (Axelsson et al. 2013). The government employees can be further broadly categorized into key decision makers and the line managers. Actors in the former category are responsible for planning and are usually the driving forces behind projects. The line managers generally act as implementers. For example, e-governance stakeholders are classified as providers and recipients of services (Gouscos et al. 2007). It has been suggested that service offerings through e-governance ought to generate additional value and benefits to stakeholders should be measurable. E-governance projects, therefore, need to be studied from the view point of benefits accruing to key stakeholders. Based on insights developed by analysing strategic gaps in an ongoing national level AGMARKNET project (Suri 2005), we have categorized stakeholders as planners, implementers and beneficiaries for further analysis.

It is observed that the key strategic objectives of e-governance projects in both developed and developing countries are linked to improving governance. Of late, scholars as well as the policy documents of international agencies like the World Bank and UNDP have been emphasizing on leveraging e-governance for bringing reforms in government system. It has been emphasized that focus of e-governance projects should be on efficient and transparent service delivery, enabling citizens' right to information, facilitating their participation in governance, etc. This approach to e-governance is adopted by many projects around the world (Sahraoui 2007). For example, in the Indian context, the erstwhile Planning Commission (Now NITI Aayog) and the Administrative Reforms Commission view e-governance as the means to attain attributes of good governance, viz. transparency, efficiency, responsiveness, cost effectiveness and accountability through application of technology (Planning Commission 2007a, b, p. 231; Planning Commission 2013, pp. 294–295; ARC 2008, pp. 60, 176). In order to arrive at a suitable measure for assessing performance of e-governance in the background of this study, it is necessary to develop an understanding about e-governance contribution and e-governance assessment.

2.3 Contributions of E-Governance

Benefits of e-governance in terms of easy accessibility to authentic and comprehensive service, saving of time and cost, enhanced transparency, better interactivity, improved responsiveness, better monitoring and control, decision-making, etc. have been discussed in many studies. Some of these are summarized in Table 2.1.

We refer to some of these articles subsequently while defining the performance variables.

Table 2.1 E-governance contributions

Author	Contributions
Tsohou (2014)	Enables public administrations to offer an increased portfolio of public services to citizens, businesses or other public agencies in an efficient and cost-effective manner
Suri (2014)	Can play a catalytic role in improving government service delivery at the grassroots by plugging gaps in the related processes
Lindgren (2013)	Improves citizens' opportunities to interact with government authorities; increases government authorities' efficiency by reducing the number of manual routines; increases democracy through greater governmental transparency
Planning Commission (2013)	Facilitates attaining attributes of good governance, viz. transparency, efficiency, responsiveness, cost effectiveness and accountability
Wang and Chen (2012)	An effective means to transform government functions, improve administrative efficiency and promote the openness of government affairs and meliorate public service
Valdes et al. (2011)	Improves the efficiency of service delivery through interconnected networks, encourages citizen participation; increases the transparency of administrative processes
UN (2008, xii)	Can significantly contribute to process of government transformation towards a leaner, more cost-effective government; can facilitate communication and improve the coordination of authorities at different tiers of government; and can enhance the speed and efficiency of operations by streamlining processes, lowering costs, improving research capabilities and improving documentation and record keeping
Luna-Reyes et al. (2007)	Collaborative e-Government contributes in the form of technical, organizational and political benefits
Harris (2007)	Prime focus of Government of India for e-governance is for greater efficiency, transparency, accessibility, accountability and reduction in procedural complexities that breed corruption
Evans and Yen (2006)	Facilitates information support to decision makers enabling them serve citizens in a more timely, cost-efficient and cost-effective manner; facilitates better coordination among different layers of government as well as government and beneficiaries
Grant and Chau (2005)	Develops and delivers high quality, seamless and integrated public services; enables effective constituent relationship management; and supports the economic and social development goals of citizens, businesses, and civil society at local, state, national and international levels
Jaeger (2005)	Promotes public participation in government
Tan et al. (2005)	Improves transparency, accountability, public participation
Zwahr et al. (2005)	Creatively destroys conventional governance institutions and transforms functioning
Bhatnagar (2004)	e-governance can have a direct impact on (a) reducing the number of intermediaries that citizens need to interact with in order to get

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Table 2.1 (continued)

Author	Contributions
	a government service; (b) improving government ability to monitor and (c) disclosing information about government processes and public budget spending to citizens
OECD (2003)	Provides citizens and governmental agencies with a convenient, cost-efficient and cost-effective way to access required government information and public services
CDT (2002)	E-Government improves efficiency and services, helps in achieving specific outcomes, can be a major contributor to reform enables greater engagement with citizens and helps building trust between government and citizens
Heeks (2001)	E-Government provides greater access to government information; promotes civic engagement by enabling the public to interact with government officials; makes government more accountable by making its operations more transparent and thus reducing the opportunities for corruption; and provides development opportunities, especially benefiting rural and traditionally underserved communities
Maio et al. (2000)	Three main contributions of e-governance: (a) improving government processes (<i>e-administration</i> : cutting process costs, managing process performance, making strategic connections in government, creating empowerment); (b) connecting citizens (<i>e-citizens or e-services</i> : talking to citizens, listening to citizens, improving public services); and (c) building external interactions (<i>e-society</i> : working better with business, developing communities, building partnerships)
World Bank (www.worldbank.org/egov)	Constant improvement of service delivery, participation of constituents and improved governance
UNESCO (www.unesco.org)	Serves different ends such as better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management
UNESCO (www.unesco.org)	Improving information and service delivery, encouraging citizen participation in the decision-making process and making governance more accountable, transparent and effective

2.4 Assessment of E-Governance

The evolving concept of assessing e-governance initiatives is attracting scholars from diverse disciplines. The purpose of some of the initial assessment frameworks was limited to developing an understanding at a broader level. For example, Layne and Lee (2001) proposed a four-stage framework in which levels of maturity were viewed as ‘Catalogue’, ‘Transaction’, ‘Vertical Integration’ and ‘Horizontal Integration’. This framework has been adopted or closely resembles many other staged models for e-governance implementation (Yildiz 2007), for example, UN

E-government Survey categorizes the stages as 'Emerging', 'Enhanced', 'Transactional' and 'Connected' (UN 2014). Grant and Chau (2005) proposed a generic framework to represent e-governance vision and implementation that would be applicable across different governments. The framework includes strategic focus areas (SFAs) mapped to one or more key functional areas (KFAs). While conceptual frameworks such as these serve the purpose of assessing e-governance services at a broader level, further instruments are required to analyse specific systems. Andersen and Henriksen (2005) have argued that the majority of e-government studies have not focused on outcomes.

The traditional financial appraisal measures such as 'Return on Investment', 'Internal Rate of Return', 'Net Present Value' and 'Payback' are relatively easy to define in a manufacturing environment but can be misleading when applied to study outcomes in e-governance context. These measures do not support the accomplishment of socio-economic and socio-political goals that generally characterize e-governance projects. To address this limitation, it has been proposed to use an outcome-based approach by considering hard as well as soft measures such as value sharing, capabilities, interactions and orientations (Gupta and Jana 2003; eGEP 2006; Lawson-Body et al. 2008; Esteves and Joseph 2008; Andersen et al. 2010). For example, the conceptual framework proposed by Esteves and Joseph (2008) is based on three dimensions, viz. *maturity levels* (innovative leaders, visionary followers, steady achievers, platform builders), *stakeholders* (citizens, employees, businesses, governments, IS/IT personnel, special interest groups) and *assessment levels* (technological, strategic, organizational, operational, services, economic).

However, most of these assessment frameworks are either yet to be tested in real-life situations or are relevant for only such few projects which have reached e-governance maturity (Karunasena and Deng 2012). A few more empirical studies are based on single case study involving a narrow group of citizens who use Internet for structured applications such as paying taxes (Wang and Liao 2008; Saha et al. 2012).

In Indian context, a few relevant research studies have emphasized on taking into account the governance aspects in performance measures (Mitra and Gupta 2008), pre-defining effectiveness parameters of e-governance programmes and cautiously managing factors of change for giving real benefits to stakeholders (Kumar 2009), managing continuity and change forces and linking it to strategic outcomes for better value creation through e-governance (Nasim and Sushil 2010) and analysing e-governance performance from multi-perspectives (Suri and Sushil 2011).

In order to showcase exemplary e-governance initiatives, the Department of Administrative Reforms and Public Grievances initiated an award scheme in the year 2009 (www.darpg.gov.in, last accessed on 24.12.2015). The projects awarded during 2015 are shown in Box 2.1.

Box 2.1(Source: www.darpg.gov.in)

The projects awarded by DARPG in 2015 are under the following categories:

Category I—Excellence in Government Process Re-engineering

Category II—Outstanding Performance in Citizen-Centric Service

Category III—Innovative Use of Technology in e-Governance

Category IV—Incremental Innovations in existing Projects

Category V—Best District Level Initiative in Citizen-Centric Service

Delivery through ICT

Category VI—Innovative use of GIS Technology in e-Governance

Category VII—Innovative use of Mobile Technology in e-Governance

Category IX—Innovative use of ICT by Central Government PSUs

Category X—Innovative Use of ICT by State Government PSUs/Cooperatives/Federations/Societies

Category XI—Outstanding e-Governance Initiative by Academic and Research Institutions

Category XII—Use of ICT for Development by Non-Government Institutions

National Awards for E-Governance

Category	Project name	Organization
I.	TDS Reconciliation Analysis and Correction Enabling System (TRACES)	Directorate of Income Tax
	e-Initiatives in Commercial Taxes	Finance Department, Government of West Bengal
II.	Passport Seva Project	Ministry of External Affairs, Govt. of India
	Kanyashree Prakalpa Portal Kanyashree online	Department of Women Development and Social Welfare, Govt. of West Bengal
III.	Suraksha Setu-Safe City Surat	Office of the Commissioner of Police, Surat, Gujarat
	Force Deployment Software	Office of Chief Electorate Officer, Bihar and National Informatics' Centre, Bihar
IV.	AGRISNET-Farm Crop Management System (FCMS)	Department of Agriculture, Govt. of Tamil Nadu
	e-Procurement	Industries Department, Industries Commissionerate, Gujarat

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Category	Project name	Organization
V.	Effective Vehicles Database Management to Trace the owners of Unclaimed Vehicles Lying in Police Stations	Mandya District Police, Home Department, Karnataka
	e-Panchayat	District Reasi, Jammu and Kashmir
VI.	Geographic Information System Project	Chhattisgarh infotech and biotech Promotion Society (CHIPS), Dept. of Information Technology, Chhattisgarh
	Application of Remote Sensing and GIS Technology in Sericulture Development	Central Silk Board, Ministry of Textiles, Government of India, Bangalore, Karnataka
VII.	State Highway Development Projects	Karnataka Public Works, Ports & Inland Water Transport Department
	SMS Based Failed Distribution Transformer Information and Management System	Madhya Pradesh Kshetra Vidyut Vitaran Co. Ltd. (Govt. of MP Undertaking)
VIII.	SAMVIDA	Rural Development Department, Govt. of Bihar & National Informatics' Centre, Bihar
	e-Governance Training and Certification	Government of Maharashtra
IX.	SAMPARK	Information Technology and Services Dept., Bharat Heavy Electricals Limited (BHEL), Bhopal, Madhya Pradesh
X.	ANMOL	State Child Protection Committee, Bhopal, Madhya Pradesh
	Quarry Management System (QMS)	Tamil Nadu Minerals Limited, Tamil Nadu
XI.	e-Jaalakam	Department of Economics, St. Teresa's College, Kerala
XII.	TCS Financial Inclusion Project	Tata Consultancy Services
	Kushal	A CREDAI Pune Metro Initiative

Source www.darpg.gov.in

For the purpose of this study, it was considered appropriate to rely upon the detailed evaluation reports of a few well-recognized e-governance projects such as AKSHYA, BHOOMI, Computer-Aided Administration of Registration Department (CARD), e-Procurement Exchange, e-Seva, Fast Reliable Instant Efficient Network for Disbursement of Services (FRIENDS), GYANDOOT, Karnataka Valuation and e-Registration (KAVERI), Lokvani, Nagarpalika. The evaluation reports throw light on significance of bringing reforms through e-governance and also highlighted by the commission setup to bring administrative reforms (ARC 2008). A summary is presented in Appendix A. Though the current status of these projects may be

different, the aforesaid studies conducted in the past provide valuable insights on performance aspects in terms of governance reform-related benefits. Performance of the evaluated projects is considered satisfactory as these projects have focused on easy accessibility to services, saving of cost and time while seeking services, extending authentic and transparent services by following an integrated approach, facilitating interactions and decision-making, better tracking of service requests and complaints, etc. These studies, however, have not attempted a comparative performance analysis from the perspectives of providers and recipient of services.

2.5 Conceptualization of Performance Variables

The proposed construct for measuring e-governance performance is based on knowledge developed about deliverables of six agriculture-related projects identified for the study. It is kept into view to consider only those aspects which are relevant to planners, implementers and beneficiaries belonging to the selected projects. The conceptualized performance macro-variable with its constituting micro-variables is explained below:

2.5.1 Macro-variable

This variable is conceptualized to capture realization of benefits expected from a project. In each of the selected projects, the benefits are expected to accrue in terms of efficiency, transparency, interactivity and decision support which are described here.

2.5.2 Micro-variables

The conceptualized micro-variables are described as follows:

Efficiency The IT-enabled government processes are expected to simplify procedures, execute faster, minimize use of papers and save costs while communicating with government. The enhanced efficiency is captured through this variable.

Transparency The variable encompasses transparency aspect of a service. An e-governance service is expected to bring transparency in government-controlled operations. A government service has to be trustworthy, thorough, unbiased and accessible without any difficulty to end users.

Interactivity An e-governance service targeting citizens is expected to facilitate interactions at various levels, i.e. within constituting units of a government

department, with other departments associated with the service and with recipient of the service. The variable is conceptualized to capture such interactions.

Decision support Digitization of services and online transactions contribute to better decision-making, monitoring and control at the level of officials as well as beneficiaries, which is captured through this variable. For example, a farmer who has online access to commodity prices/arrivals information and storage facilities can monitor prevailing prices, store his produce or select a market for selling his produce when conditions are favourable. This micro-variable reflects better decision support in terms of improved planning and decision-making

Mapping of these variables with reviewed literature and project evaluation reports is presented in Table 2.2.

The performance constructs have been subjected to factor and reliability analysis and found to be satisfying the validation criteria. The validated performance constructs have been used for further analysis.

2.6 Generalized Multi-perspective Performance Analysis

Tables 2.3 and 2.4 present an F-test-based comparative analysis of performance perceived by the three actor groups considered for the study. The three means are found to be statistically different with the macro-level relationships revealed as (Suri and Sushil 2012).

$$\begin{aligned} \text{PerformanceMean(Planners)} &> \text{PerformanceMean(Implementers)} \\ &> \text{PerformanceMean(Beneficiaries)}. \end{aligned}$$

Similar tests are applied to compare the perceptions of the three groups about performance in terms of micro-variables. Further, the four constituting variables are subjected to similar test. The micro-level analysis reveals that

- In terms of efficiency and transparency, e-governance has contributed more at the level of planners followed by implementers and beneficiaries in that order.
- In terms of interactivity, e-governance has contributed more at the level of planners when compared with implementers and beneficiaries. The interactivity-related benefits are perceived to be same at the levels of implementers and beneficiaries.
- In terms of decision support, the planners and implementers are drawing more benefits from e-governance as compared to the beneficiaries.

The observed average performances for beneficiaries, implementers and planners are found to be 0.5, 0.6 and 0.7, respectively, which is indicative of gaps at various levels (Figs. 2.1 and 2.2).

Table 2.2 Variables conceptualized for assessing performance of e-governance project

Performance aspect	Micro aspects	Author (Year)	Projects (Appendix A)
Efficiency	Fast execution of core process/improved Service Delivery	UNESCO, Lindgren (2013), Scott et al. (2011), Andersen et al. (2010), Mofleh et al. (2009), Esteves and Joseph (2008), UN (2008), Planning Commission (2013), Evans and Yen (2006), Bannister (2002), Heeks (2001), Maio et al. (2000)	AKSHYA, BHOOMI, CARD, e-Procurement Exchange, e-Seva, GYANDOOT, Lokvani, Nagarpalika
	Simplification of procedures	UNESCO, Karunasena and Deng (2012), Mofleh et al. (2009), UN (2008), Harris (2007), Bannister (2002), Maio et al. (2000)	e-Procurement Exchange, BHOOMI, CARD, e-Seva, FRIENDS, KAVERI, Nagarpalika
	Reduced paper work	Karunasena and Deng (2012), UN (2008), Planning Commission (2007ab), Altameem et al. (2006), Evans and Yen (2006), Heeks (2001)	e-Procurement Exchange, e-Seva, GYANDOOT, KAVERI, Nagarpalika
	Reduced communication cost	UN (2008), Planning Commission (2013), Evans and Yen (2006), Vassilakis et al. (2004), Heeks (2001)	e-Procurement Exchange, e-Seva FRIENDS, GYANDOOT, KAVERI
Transparency	Reliable information delivery	Karunasena and Deng (2012), Andersen et al. (2010), OECD (2003), Bannister (2002)	BHOOMI, CARD, KAVERI, Nagarpalika
	Comprehensive information delivery	Karunasena and Deng (2012), Bhanagar (2004)	AKSHYA, KAVERI
	Easy access to information	World Bank, Alawneh et al. (2013), Karunasena and Deng (2012), Scott et al. (2011), Esteves and Joseph (2008), Harris (2007), Danziger and Andersen (2002), Bannister (2002)	BHOOMI, CARD
	Fairness	UNESCO, Harris (2007), Planning Commission (2007a, b), Tan et al. (2005), OECD (2003), Bannister (2002)	e-Procurement Exchange, e-Seva, FRIENDS

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Table 2.2 (continued)

Performance aspect	Micro aspects	Author (Year)	Projects (Appendix A)
Interactivity	Improved interaction (with internal actors, actors belonging to other related organizations, beneficiaries and government as per the respondent category)	UNESCO, Word Bank, Lindgren (2013), Karunasena and Deng (2012), Valdes et al. (2011), Gauld et al. (2010), Andersen et al. (2010), Mofleh et al. (2009), Esteves and Joseph (2008), UN (2008), Evans and Yen (2006), Jaeger (2005), Tan et al. (2005), Bhatnagar (2004), OECD (2003), Bannister (2002), Heeks (2001), Maio et al. (2000)	CARD, e-Procurement Exchange, FRIENDS, Lokvani
Decision support	Improved planning and decision-making	UNESCO, Andersen et al. (2010), Evans and Yen (2006), Bannister (2002)	BHOOMI, e-Procurement Exchange, GYANDOOT, KAVERI, Nagarpalika
	Better Monitoring and control	Andersen et al. (2010), Bhatnagar (2004)	BHOOMI, e-Procurement Exchange, KAVERI, Lokvani, Nagarpalika

Adapted from (Suri and Sushil 2012)

Table 2.3 One-way ANOVA (Performance X Actor Group)

PERF						
	Sum of squares	df	Mean square	F	Sig.	
Between groups	1.233	2	0.616	17.121	.000	
Within groups	10.045	279	0.036			
Total	11.278	281				

Table 2.4 Post hoc tests (Performance X Actor Group)

Multiple comparisons						
Dependent variable: PERF						
LSD						
		Mean difference (I-J)	Std. error	Sig.	95 % confidence interval	
(I) Group	(J) Group				Lower bound	Upper bound
Planner	Implementer	0.0993 ^a	0.03656	0.007	0.0273	0.1713
	Beneficiary	0.1914 ^a	0.03548	0.000	0.1216	0.2613
Implementer	Planner	-0.0993 ^a	0.03656	0.007	-0.1713	-0.0273
	Beneficiary	0.0921 ^a	0.02440	0.000	0.0441	0.1402
Beneficiary	Planner	-0.1914 ^a	0.03548	0.000	-0.2613	-0.1216
	Implementer	-0.0921 ^a	0.02440	0.000	-0.1402	-0.0441

^aThe mean difference is significant at the 0.05 level

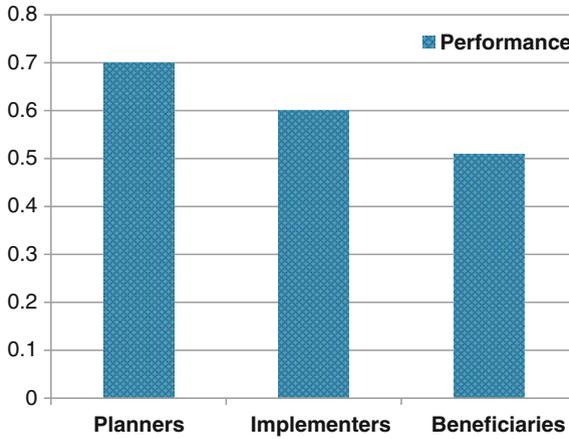


Fig. 2.1 Perceived e-governance performance (Macro-level)

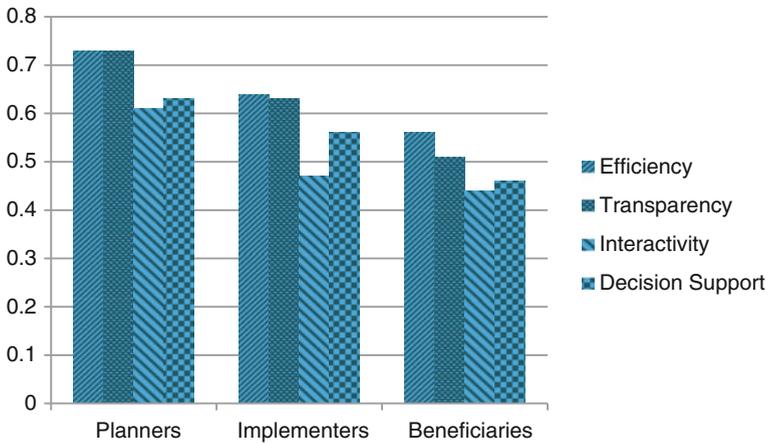


Fig. 2.2 Perceived e-governance performance (Micro-level)

The gaps in perceptions about e-governance performance clearly reflect better adoption of ICT facilities at the level of planners when compared with implementers. This suggests for strengthening infrastructure at the operational level and encouraging the officials involved in implementation to regularly upgrade their skills. Further, the services do not seem to be reaching the beneficiaries to the desired extent. The beneficiaries need to be sensitized about e-governance services with a focused approach. Access to services needs to be smoothed by creating multiple delivery channels suiting to the background and needs of the beneficiaries.

2.7 Concluding Remarks

The potential of e-governance for reforming governance system needs to be leveraged by various government organizations, particularly those belonging to the developing world. Keeping in view the past trend of dismal performance of e-governance projects, it is important to devise instruments to measure performance of projects which can be used by the practitioners for reviewing projects from this perspective. This chapter has brought out a performance measure which has been applied to analyse performance from the viewpoints of key actors types identified for the study. It has been found that there are perception gaps among providers and recipient of e-governance services. The next chapter would present a synthesized strategic framework for improving e-governance performance, followed by its implementation considerations. The framework is based on a synthesis of qualitative and quantitative analyses performed as part of the study.

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