A FRAMEWORK FOR THE DEVELOPMENT OF ELECTRONIC GOVERNMENT PROJECTS IN PUBLIC SERVICE ORGANISATIONS IN OMAN

ABDULLAH JUMA BARYAA

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Abdullah Juma Baryaa

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DEDICATION

To my parents; without your assistance, this thesis would not have been completed.

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DECLARATION

"I, Abdullah Baryaa, declare that the PhD thesis entitled *A Framework for the Development of Electronic Government Projects in Public Service Organisations in Oman* is no more than 100,000 words in length, exclusive of tables, figures, appendices, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other degree or diploma. Except where otherwise indicated, this thesis is my own work."

Signature

Date: 20/3/2008

ABSTRACT

The research focuses on the development of e-government initiatives at public sector organisations in Oman. As e-government matures in importance and priority for governments worldwide, an understanding of the factors that influence their successful development is invaluable. Therefore, in order for e-government initiatives to be successful, the influencing factors should be identified and evaluated. This research examines the factors that could guide the successful development of e-government initiatives in public-sector service organisations in Oman. Based on the research objectives, a case study approach was found to be appropriate and employed throughout this research. The data was gathered utilising a questionnaire and semi-structured interviews.

The research results found a set of factors to be significant in the development of e-government initiatives. The study found that top management support is a key ingredient for the successful development of e-government projects as well for as overcoming an initial resistance to the new learning required for e-government services. The findings of this study help to explain the types of factors that facilitate the successful development of e-government initiatives and reveal the importance of management support to that success. In addition, the study outcome stresses the necessity to create cooperation between public-sector organisations and the private sector in Oman in order to improve the effectiveness of e-government services planning and development. The results also show that the telecommunication infrastructure plays a key role in the spread and success of e-government projects, as does a framework of appropriate legal and government polices.

This thesis asserts that the successful development of e-government projects requires continued political support and public-sector organisations will have to explore new relationships with other government organisations as well as partnerships with the private sector to ensure greater integration of e-government services. It is recommended that implementing a broader approach including organisational features, perceived characteristics of innovations and surrounding environmental influences would yield a better understanding of any e-government initiative.

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List of Abbreviations

ADSL:	Asymmetric Digital Subscriber Line
ACH:	Automated Clearing House
ATM:	Automated Teller Machine
AVE:	Average variance extracted
B2B:	Business-to-business
B2C:	Business-to-consumer
CBO:	Central Bank of Oman
COI:	Communities of interest
CR:	Commercial registration
DOI:	Diffusion of innovation
DSL:	Digital Subscriber Line
E-gov:	Electronic government
E-com:	Electronic commerce
ESCWA:	Economic and Social Commission for Western Asia
ERP:	Enterprise resource planning
EFT:	Electronic Funds Transfer
GCC:	Gulf Cooperation Council
GDP:	Gross Domestic Product
GNI:	Gross National Income
GTB:	Government Tender Board
G2B:	Government-to-business
G2C:	Government-to-citizen
G2E:	Government-to-employee
G2G:	Government-to-government
GSM:	Global System for Mobile Telecommunications
GPS:	Global Positioning System
ICDL:	International Computer Driving License
IC3:	Internet & Computing Core Certification
ICT:	Information and communications technology
ISD:	Integrated Services Digital Network
ISP:	Internet service provider
IS:	Information systems
ITES:	IT-enabled services
ITU	International Telecommunication Union
IT:	Information technology
IP:	Internet protocol
LAN:	Local Area Network
MIS:	Management information systems
MoCI:	Ministry of Commerce & Industry
MONE:	Ministry of National Economy
MOE:	Ministry of Education
MRial:	Mobile Rial (Rial is Oman Currency)
MPLS:	Multi-Protocol Label Switching technology
Nawars:	the second mobile services operator in Oman
OECD:	Organisation for Economic Cooperation and Development
Omantel:	Oman Telecommunications Company
OMNIC:	Oman Network Information Centre
OSS:	One-Stop Shop

SPSS: Statistical Package for Social Science
TCP/IP: Transmission control protocol/Internet protocol
PC: Personal computer
PDO: Petroleum Development Oman
PASI: Public Authority for Social Insurance
ROP: Royal Oman Police
RTGS: Real-time Gross Settlement
SED: Socio-economic database
TAM: Technology acceptance model
UNDP: United Nations Development Programme
UNECE: United Nations Economic Commission for Europe
UNESCO: United Nations Educational, Scientific and Cultural Organisation
VPN: Virtual Private Network
WAN: Wide Area Network
WAP: Wireless Application Protocol
WLL: Wireless Local Loop
WPIIS: Working Party on Indicators for the Information Society
WSIS: World Summit on the Information Society
WTO: World Trade Organisation

1 INTRODUCTION

The aim of this chapter is to provide a general overview of this research project. More specifically, this chapter introduces the research objectives, research contributions and statement of significance. In addition, it defines the research subject under investigation followed by the emerging research questions and the proceeding thesis chapters.

1.1 Research background

The aims of e-government projects are to improve government performance in terms of traditional service delivery, efficiency and accuracy and to reduce the time and cost required to complete transactions with government, in addition to achieving integration and coordination between the various governmental bodies. The overall objective is to achieve efficient, transparent and better functioning of the government organisations, thereby overcoming the stereotypical negative views held by many citizens about their interactions with government bodies.

In addition, an e-government program that achieves the goals of national transformation and brings about the desired reforms to and development of government to achieve those goals, therefore, must be a reference point to coordinate the efforts of other government bodies. It will demonstrate the use of modern methodologies and experience in various fields of human knowledge, to encourage those government bodies in their integration efforts. It will point the way to achieving the most successful application of the transformation process, thus achieving the desired objectives on one hand and the national objectives on the other.

Many countries around the globe have adopted and implemented e-government strategies to assist the delivery of and access to government services. As a result of this global phenomenon, most of the Gulf Cooperation Council (GCC) governments, including Oman, have been very quick to realise the potential of information and communication technologies (ICT) in driving growth and sustainable development in their region.

There are many similarities between the concepts of e-government and e-business (e-commerce). They are both based on Internet technology to assist the exchange of goods, services and information between two or more parties and so are

categorised in similar ways. They also provide similar services to individuals and organisations. In addition to that, e-business and e-government systems support the electronic mediation of transactions over potentially great distances.

On the other hand, there are many differences between e-commerce and e-government. For instance, with e-commerce, businesses are allowed to target their customers; whereas with e-government, agencies are responsible for providing access to information and services for all citizens. It must also be remembered that the structure of businesses in the private sector is different from that of public-sector organisations. Decision-making authority is less centralised in government agencies than in other businesses. Furthermore, the political nature of government organisations is a unique differentiator of e-government from e-commerce.

One aim underlying the introduction of e-government projects is to help in building confidence between the government and citizens, through creating new channels for the links between citizens and government organisations. Cooperation between different institutions is one of the most important rules underpinning e-government projects.

1.2 Research objective

The literature presents many definitions of electronic government (e-government). For the purpose of this study, e-government is defined as 'the transformation of public-sector internal and external relationships through Internet-enabled operations and information, technology and communication (ICT), to optimise government service delivery, constituency participation and governance'. (Baum and Maio, 2000). Existing studies on e-government initiatives (Fountain, 2001, Hinnant, 2002, Ho, 2002, Moon, 2002, Carter and Belanger, 2004, Carter and Belanger, 2005, Ho and Ni, 2004) focus mainly on the technological aspects of e-government projects, rather than on the social, organisational and environmental factors related to peoples' perceptions of and attitudes towards such projects. This research work examines the factors that lead to the successful development of e-government initiatives in public-sector service organisations. The specific aims of the study are:

- To investigate the factors (perceived characteristics of innovations, environmental, and organisational) influencing the successful adoption of e-government initiatives in public-sector organisations in Oman

- To identify the e-government characteristics and attributes that most affect the adoption and development process
- To design and pilot-test an adoption model for successful e-government projects in public-sector service organisations using a broad framework for conceptualising e-government development.

In general, the research aims to illustrate the importance of the factors identified in literature (such as diffusion of innovation theory) and any other newly identified factors which help to explain the successful adoption and implementation of e-government initiatives in public-sector service organisations. Specifically, this research will focus only on the successful adoption and development of e-government projects and will not emphasise other aspects of general technology adoption.

1.3 Contribution to knowledge

The research makes theoretical contributions to the diffusion of innovations (DOI) and organisational adoption literature by developing and testing a model related to the adoption and implementation of successful e-government initiatives. In addition to that, the study is unique in its use of an integrated model incorporating three dimensions (perceived characteristics of innovations, organisational factors and environmental factors). This will allow the testing of factors comprising the model related to e-government project adoption and diffusion that have been unexplored by previous studies.

From a practical perspective, the research has implications for public-sector service organisations and decision-makers charged with introducing Internet-based technologies such as e-government projects. The study will provide a contribution by identifying the influencing factors (facilitators and inhibitors) for e-government project adoption and implementation in public-sector service organisations in Oman. By recognising those influencing factors, public-sector service organisations in Oman are expected to be able to formulate better strategies in adopting and implementing successful e-government initiatives, in order to increase their service quality and productivity. Finally, it is important for the managers and decision-makers of public-sector service organisations to be aware of the determinants of the adoption and use of e-government projects in order to avoid problems that could arise and minimise the risk of project failure.

1.4 Statement of significance

The study is significant for both government managers and decision-makers in public-sector service organisations in making them aware of the determinants of any e-government project's success. Knowing the influencing factors can enhance the effective, successful adoption and implementation of e-government services and overcome any resistance that might appear. In addition to that, e-government implementation managers will be able to create an environment which encourages the acceptance of such projects and involves the stakeholders in the process of implementation. Moreover, identifying those factors most affecting the successful development of e-government projects enables managers and decision-makers to focus on those factors that need their consideration if they are to avoid the failure of their projects.

A significantly different aspect of this study is that the three influencing factors (perceived characteristics of innovations, organisational and environmental factors) identified in the IS adoption and implementation literature are combined with an effort to incorporate specific aspects of e-government initiatives. It also builds upon the results of previous studies into the acceptance of new technologies such as e-government and e-commerce. Finally, it provides guidelines for decision-makers to overcome resistance and other problems that can arise in the process of adopting and accepting e-government projects.

1.5 Research question

A critical analysis of the literature shows that innovation theory has been examined widely in a private-sector context. The development of successful e-government initiatives provides an area in which to examine the direct applicability of the established private-sector model and identify any other relevant factors to be incorporated if the model is to be extended to the public-sector.

Many countries are continuing to face the challenge of implementing successful e-government initiatives. For that challenge, figuring out what determinants affect the adoption of e-government projects carries significant implications. Consequently, an investigation into the factors that contribute to the successful adoption and implementation of e-government services is needed. Given

these motivations, this research effort investigates the following general research question:

- What are the factors that lead to successful development of e-government initiatives in public-sector service organisations?

Despite the wealth of research into the e-government area, this question has not been widely explored. This study therefore focuses on the contextual effects of the perceived characteristics of innovations, organisational and environmental variables that influence public-sector organisations in their development of successful e-government initiatives. Hence the following sub-questions are also addressed:

Q1: What are the characteristics of e-government, and how do these characteristics influence a public-sector organisation's decisions in developing successful e-government initiatives (technological context)?

Q2: What are the organisational characteristics that influence a public-sector organisation's decisions in developing successful e-government initiatives (organisational context)?

Q3: What are the environmental characteristics that influence a public-sector organisation's decisions in developing successful e-government initiatives (environmental context)?

1.6 Methodology

Based on the research objectives, a case study research approach was found to be appropriate and will be employed throughout this research project. According to Yin (1994), a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. Based on the suggestions of Yin (1994), the data for this research will be gathered by means of a survey questionnaire and semi-structured interviews, supported by a review of organisational documents and plans. These data collection techniques will be used to provide more detailed data about the development of successful e-government projects. For this project, the case being studied is the public sector in Oman. Therefore, the reason behind using

multiple data collection techniques is to enhance the understanding of the qualitative data alongside the statistical tests.

The questionnaire has been designed to obtain the views of potential influencers of the successful development of e-government projects in public-sector organisations in Oman. The data gathered from this phase aims to answer the sub-questions (mentioned earlier), by identifying the influencing factors such as organisational, environmental and perceived innovation attributes.

1.7 Study boundaries

This study will focus only on those technological (relative advantage, compatibility, complexity, costs), organisational (top management support, IT capability, organisation size, IT champion) and environmental factors (external influence, policy and legal framework). The rationale behind such a decision was to limit the study to certain boundaries due to factor significance and limitations on time and manpower. There are many organisational factors that could influence the success of e-government or other projects which are underpinned by Web-based technologies; they include organisational culture, organisational power and control, and organisational change. However, this research will focus only on those factors indicated above.

The study's perspective of e-government is limited to the delivery of services and does not consider other aspects such as e-governance or e-democracy. The study's generalisation is also limited to Oman alone. The study does not canvass citizens' perceptions about adopting e-government; instead it focuses on the public-sector decision-makers who are in charge of such projects. The issue of customer satisfaction with e-government could be an area of future research.

Certain boundaries have been introduced, which include examining only those factors influencing the successful implementation of e-government projects; the intention is not to investigate the risks associated with such projects, nor the social and cultural factors that may be involved.

1.8 Results generalisation

As Oman's political structure (including top management support and politico-legal arrangements) and other demographic and socio-technical influencing factors are

more or less similar throughout the GCC countries, it would make the issue of applicability of the model more related to those countries than to others outside of the Gulf Cooperation Council. However, it is possible that the model could be applicable more widely in countries with similar characteristics in terms of e-government plans.

1.9 Thesis outline

This thesis is divided into eight chapters. Chapter one presents a brief background and introduction to the research problem, its significance, and the scope of the research. Following this introduction, the second chapter provides the general factors affecting the successful acceptance and implementation of Information Systems (IS) and reviews the e-government development literature. Specifically, the research investigates only the factors contributing to the successful adoption and acceptance of e-government initiatives; it does not emphasise other aspects of general technology adoption.

Chapter three describes the procedures used to conduct the study and discusses the research methodologies used to explore the research objectives. Justifications for the choice of a case study methodology as an appropriate means to explore the research questions further are also explained.

Chapter four describes the case study under investigation including a description of Oman's administrative system, its geographical locations, economic and political situation. The chapter also discusses the steps being taken by the government to introduce ICT projects throughout Oman in general and within public-sector organisations in particular. In addition, a more detailed description of the current e-Oman digital society project and its sub-projects (including e-government initiatives) are reviewed in more detail.

Chapter five begins by analysing the research data collected using questionnaires distributed to public-sector employees in Oman. The data analysis involved compiling demographic information about the respondents, the performance of reliability and validity checks and the testing of relationships between variables. Chapter six presents a description of the results obtained to answer the research questions. In addition, the research reviews the current situation and how to achieve the overall aim of achieving a digital society, or e-Oman.

Chapter seven presents a set of strategies that government organisations should employ to assure the success of e-government projects. In conclusion, the final chapter aims to gather the findings of this research and summarise the results obtained. Chapter eight also examines the research implications, contributions to literature, research limitations and future research opportunities.

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2 LITERATURE REVIEW

This chapter highlights the general factors for the successful acceptance and implementation of Information Systems (IS) and reviews the e-government development literature. Specifically, the research will investigate only the factors contributing to successful adoption and acceptance of e-government initiatives and will not emphasise other aspects of general technology adoption. Some of these will overlap with – and thus be informed by – 'general' IT diffusion of innovations theory

Modelling the acceptance of e-government technologies by public organisations requires capturing the influence of several organisational characteristics, technological and environmental factors (Hinnant, 2002). Therefore this research will consider factors of organisation, environment and perceived characteristics of innovation from a holistic point of view.

2.1 Information systems acceptance literature

The introduction of an innovation, especially in the form of a more advanced technology, is assumed to bring improvements to organisations (Downs and Mohr, 1976). Additionally, the technology needs to offer benefits to an organisation's members in order to be adopted. Danziger and Dutton (1977) identified the characteristics that explain the adoption and use of computers as an innovative technology at the local government level in the USA. They found four categories which impact upon intergovernmental variations in the use of computer technology: environmental factors; factors which facilitate the adoption and use of the innovation; the array of interests and values served by innovation; and the level of decision-making authority distributed to those whose values are served by the innovation.

According to Van de Ven (1986), many factors could facilitate or inhibit the development of innovations including people, ideas, transactions and context over time. Markus (1983) described three theories of resistance to IS diffusion and implementation in an organisation: people-determined, system-determined and interaction theory. According to Markus, the people-determined resistance theory is based on the assumption that the cognitive styles of users are the main source of resistance to implementation. As a result of that, failure to adopt a new system is related to the personalities and behaviours of the individuals.

Markus based the system-determined resistance model on the assumption that system-related factors may be the root cause of implementation failure. People's resistance to Management Information Systems (MIS) is affected by factors such as technically deficient systems, systems that are not ergonomically designed and those that are not user-friendly. According to this theory, system-related factors such as technical stability and ergonomics are assumed to be the root cause of implementation failure.

By contrast, the interaction theory assumes that the intersections of designer intention and user perception cause implementation problems. Markus explained resistance as 'a product of the interaction of system design features with the intra-organisational distribution of power'. According to Markus and Robey (1988), the three models of adoption when implementing a system are the technological imperative, the organisational imperative and the emergent perspective models. The technological model suggests that information technology is an independent variable that affects organisational structure and when a system is implemented it will change the way people work.

The organisational model assumes that people are decision-makers in anticipation of – or in response to – environmental changes. This model of implementation is thought to be most applicable when an organisation has stable political, personal and social coalitions. Basically, management intervention plays an important role in this type of implementation.

The emergent perspective model is driven by the assumption that people and technologies interact in unpredictable ways and information technology is viewed as both an independent and a dependent variable in this perspective. This model of implementation requires frequent amendment in response to changeable barriers. The

key to adoption in this model is the initial deployment of a system, followed by planned monitoring and adaptation (Markus and Robey, 1988).

Reich and Benbasat (1990), investigating the adoption of customer-oriented IOS, found the adoption was related to customer awareness of need and support. Similarly, Brudney and Selden (1995) studied the adoption of computer technology in municipalities and determined whether findings from larger local governments can apply to smaller cities and towns. The authors suggested that larger cities may adopt computers first because they can realise greater benefits from information processing routines, and that scant resources and slack administrative performance do not affect adoption or extent of use. Likewise, Gerasimod and Clifford (1997) examined the adoption of administrative innovations by local government finance officers in Ohio. The authors argued that individuals drive the process of adopting administrative innovations and their findings illustrate the importance of capturing the local environment, governmental structure and political culture in explaining the diffusion of innovation.

Borins (2001) reported several variables for introducing innovation into a government organisation, including: anticipating obstacles when attempting to implement innovation; responses to these obstacles; recognition that there are potential supporters of innovation both within and outside of the organisation; making use of all of the essential and potential stakeholders once identified; and the ability to provide support and resources to foster an innovative culture within the organisation.

2.1.1 Success factors in technology implementation

Daft (1978) suggested that technological innovation is accepted in organisations where organic structures exist, while more mechanistic forms promote administrative innovation. Technological innovation involves the adoption of an idea that directly influences the basic output processes (Daft, 1978). Kotter and Schlesinger (1979) suggested many variables to overcome resistance to change including education and communication, participation and involvement, facilitation and support, negotiation and agreement, manipulation and co-option, and explicit and implicit coercion. Those who adopt innovation share some common organisational characteristics, just as do those who do not adopt innovation (Leonard-Barton, 1985)

Markus and Robey (1988) asserted that there is no generic model for the success of IT implementation. Management support can overcome political resistance and encourage participation throughout the organisation (Markus, 1983). Markus asserted that systems which change the control of information in organisations would be resisted by those who lose control and accepted by those who gain it. Moore and Benbasat (1991) argued that the adoption of information technologies by individuals and organisations is part of the process of information systems implementation. The authors highlighted the major focus in many IS studies as being the influence exerted on the adoption of an IT innovation by the potential users' perceptions of it.

Hoffer and Alexander (1992) asserted that senior management support and champions are important in pushing for the adoption and implementation of new technology. Sokol (1994) proposed categories for the people-barriers to overcoming implementation failure including management support, training, participation, feedback, attitudes and behaviours. Salmela and Turunen (2003) suggested that organisation size, implementation horizon and environmental turbulence are the sorts of issues on which to focus for the successful implementation of information technology.

According to Markus and Benjamin (1997), the failure of many large-scale projects involving new IT for reasons unrelated to technical feasibility or reliability is well known and is usually attributable to its implementation. Senior management commitment is critical for the success of the whole ERP implementation process (Stratman and Roth, 1999). Wixom and Watson (2001) proposed that implementation factors such as management support and user participation are likely to influence the success of data warehouse implementations.

In order to reduce employees' resistance to IS implementation, senior management must investigate the sources of resistance and utilise an appropriate set of strategies to counter them (Aladwani, 2001). Further, Tracey (2003) found that management issues related to the planning, implementation and maintenance of new technology systems are the most reported people-related barriers to successful implementation.

2.1.2 Technology implementation failure

According to Lucas (1975), the problems with user acceptance of information systems have been widely observed. He asserted that the relationship between the unsuccessful implementation of information systems projects and the social, human, managerial and economic factors is not a new phenomenon. Kotter and Schlesinger (1979) emphasised the importance of identifying resistance to change within an organisation. Among the reasons people would resist change are: a desire not to lose something of value; a misunderstanding of the change and its implications; a belief that the change does not make sense for the organisation; and a low tolerance to change. Moch and Morse (1977) emphasised the importance of experts in the organisation who value the benefits offered by the innovation and accelerate the decision to adopt it.

A great deal of research supports the importance of attitudes, beliefs and expectations to technology acceptance and use (Davis, 1989). Long (1987) found that only 10 per cent of failed projects were related to technical factors, whereas 90 per cent of those failures were linked to managerial and human factors. Moore and Benbasat (1991) highlighted that understanding how to implement IT successfully is one of the critical issues in the IS field. It is widely known that many large-scale change management projects involving new information technology fail for reasons unrelated to technical feasibility and reliability (Markus and Benjamin, 1997) and they argued that one cause of persistent systems failures is related to social factors. Similarly, Doherty and King (2001) found that 60 per cent of IT executive managers believe non-technical factors are more important than technical factors for the successful implementation of an IS project.

Markus and Tanis (2000) asserted that enterprise systems are one of the most interesting developments and represent an important contemporary phenomenon in the organisational use of information. The authors explained that some organisations have failed in their attempts to install ERP systems. The high failure rate of ERP implementation calls for a better understanding of its critical success factors (Somers *et al.*, 2000).

Watson et al. (1999) illustrated that among the reasons leading to the failure of data warehousing projects are weak sponsorship, lack of management support, insufficient funding, inadequate user involvement and organisational politics. Similarly, McAfee (2003) noted that there are many sources of IS implementation failure including inertia, resistance, misspecification, misuse and non-use.

There have been many studies carried out to examine the adoption and implementation of computer use and acceptance as a technological innovation (Daft, 1978; Danziger & Dutton, 1977; Davis, 1989; Tornatzky & Fleischer, 1990; Rogers, 1995). These studies offer important theoretical bases for the social and technical factors that play a role in the successful adoption and implementation by public organisations of Internet-based technologies such as e-government. The following sections will review existing e-government implementations and their related success factors. As many public-sector organisations are planning for or implementing some forms of e-government services, there is a need to understand how these projects can be managed successfully.

2.2 Electronic government development literature

Information technology has been used by government organisations since the 1960s and 1970s. In the early 1970s and 1980s, the role of ICT in government consisted of automating internal data processing in a similar manner to private-sector enterprises. Research indicates that the characteristics of the technology play a vital role in determining whether or not it will be adopted by an organisation (Tornatzky & Klein, 1982). In recent years, the role of ICT has supported and transformed the external workings of government by processing and communicating information and data (Yared, 2002).

Like many other managerial concepts and practices in public administration, the idea of e-government followed the private sector's adoption of e-business and e-commerce (Moon, 2002). Therefore, the introduction of the e-commerce and e-government initiatives in place of traditional information systems is just redefining what is currently known about information technology. There are many similarities between the concepts of e-government and e-business (e-commerce). They are both based on Internet technology to assist the exchange of goods, services and information between two or more parties. Hence, e-commerce and e-government are categorised in similar ways; they also provide similar services to individuals and organisations. In addition, e-business and e-government systems support the electronic mediation of transactions over potentially great distances.

On the other hand, there are many differences between e-commerce and e-government. For instance, in e-commerce, businesses are allowed to target their

customers whereas in e-government, agencies are responsible for providing access to information and services to all citizens. Furthermore, the structure of businesses in the private sector is different from that of organisations in the public-sector.

A review of the literature indicates that research into the factors for successful e-government development is limited, at least from a theoretical point of view. Governments are looking to e-government as a solution to reduce costs, improve communications between government departments and the public, increase efficiency within the bureaucratic systems of government and encourage greater citizen participation in government processes (Grönlund, 2002, Foundation, 2001).

Government organisations have been slower than the private sector to adopt modern IT for improving their administrative and socio-economic data (Kraemer and Dedrick, 1997). Previous research suggests that the successful implementation of IT is influenced by two major factors: the technology and the local conditions of the users. IT – especially technological innovations such as e-government – will not have much operational value unless these two elements are developed in ways relevant to the needs and conditions of the potential users, which are specific to time and place (Darmawan, 2001).

The adoption and diffusion of Internet-based technologies such as e-government is quite a new concept to public-sector organisations. According to the growth model of e-government (Layne and Lee, 2001), creation of a government website corresponds with the five steps of the innovation-decision process. Furthermore, in the context of the present study, 'e-government' is considered as an innovation and individual government organisations as units of adoption of e-government services, while government officials represent the decision-makers of those units. Under the global pressure of information technology, the adoption of web-based technologies in public administration has created a new government-and-citizen interface (Wong and Welch, 2004).

Many countries have adopted and implemented e-government strategies to assist access to and delivery of government services. 'Much like businesses with electronic commerce, public organisations are beginning to embrace electronic government' (Holden et al., (2003). The authors emphasised that the adoption of e-government by local governments generally follows a similar pattern of information technology adoption. According to Holden et al. (2003), among the barriers to the

adoption of e-government are lack of technology or web staff; lack of financial resources; security issues; and the need to upgrade existing information technology.

There are many challenges facing the implementation of e-government, ranging from issues of technical infrastructure to those of organisational culture (Williams, 2003). If e-government is to become established on a large scale, these issues must be identified and addressed. Therefore, e-government implementation managers must be able to create an environment that fosters change while also winning the hearts of the employees tasked to work within the system. Unless public-sector agencies and departments put citizens, consumers and their needs and problems first, then e-government is likely to be nothing more than a financial black hole (Al-Kibsi *et al.*, 2001).

Some organisational-level research indicates that the structural arrangement of organisations plays an extremely important role in determining their full acceptance of technological innovations (Hinnant, 2002). Hinnant maintained that organisations with high levels of structural complexity but low levels of formalisation and centralisation tend to initiate relatively more innovations than do organisations with opposing characteristics.

Most government organisations are bureaucracies with hierarchically-organised distributions of authority, resources and responsibility flowing downward to work units, and information about organisational performance flowing back upward as a means of control (Kraemer and King, 2003). Most government managers, claimed these researchers, want to keep organisations that way for good reasons. Today's e-government initiatives are part of a broader government reform agenda that emphasises customer service and greater responsiveness to citizens (Kraemer and King, 2003). The success of e-government depends on a better understanding of the types of barriers that inhibit or prevent its use, as well as the public's information-gathering preferences and past experiences in gathering information and dealing with particular government departments and agencies (Heeks, 2003b).

Kaaya (2004) asserted that the implementation of e-government strategies involves complex and multidimensional technological applications. Heeks (2003b) presented eight factors that lead to successful e-government projects. These success factors include external pressure, internal political desire, overall vision and strategy, effective project management, effective change management, effective design, necessary competences and adequate technological infrastructure.

According to a field study carried out by Jabar and Razaoqi (2003) on the future implementation of e-government projects in public organisations in Oman, 75 per cent of the respondents – mainly government officials – reflected their use of the Internet in their offices. The authors listed several issues that prevent public organisations from having an Internet connection including lack of qualified technical staff, lack of financial resources, high cost of the Internet to the organisation, privacy and security issues, etc. They found that 80 per cent of respondents revealed that their organisations plan to expand the workplace use of the Internet in the future.

In the same way, Al-Ruzaiqi (2003) found fourteen determinants for the implementation of e-government initiatives including IT standards, IT infrastructure, IT security, national infrastructure, relative advantage, compatibility, complexity, inter-agency collaboration, reward system, management support, vision, work process reform, technical expertise and awareness.

Ho and Ni (2004) presented a framework for analysing the adoption of e-government features, concluding that the perceived characteristics of e-government services, peer influence, internal political support and external consistency pressure have an influence on an organisation's decision to adopt or reject e-government services. Likewise, Carter and Belanger (2004) investigated the influence of the perceived characteristics of innovation on the adoption and acceptance by citizens of e-government projects. They found perceived relative advantage, image and compatibility to be significant factors in predicting the intention of citizens to use state e-government services.

Gant (2004) asserted that the integration of human, organisational and information technology capabilities is essential to government success in the implementation of e-government projects. Gilbert et al. (2004) investigated the factors related to decision-making about the usage of an online e-government delivery mechanism. They found that the barriers to adoption are trust issues, financial security and information quality, whereas savings of time and money are both benefits of adoption. These results are indicators for public-service manager to consider both the barriers to and benefits of adoption in order to increase the take-up of their electronic services.

2.3 Theoretical background

The adoption and use of technology have been studied extensively in recent decades and several theoretical models have been developed to explain its adoption and use (Ajzen, 1991, Fishbein and Ajzen, 1975, Rogers, 1995). The 'diffusion of innovation' (DOI) theory was developed by Rogers (1995) and widely tested and adapted in many areas, including the information systems field. Basically, the theory suggests the perceived characteristics of innovation are one important explanation for the adoption rate of innovations. The characteristics of innovation are relative advantage, compatibility, complexity, trialability and observability. Rogers' well-known diffusion of innovation theory can provide important insights into the factors that influence the adoption and diffusion of successful e-government initiatives in public-sector service organisations.

According to Rogers' work, adoption is '... a decision to make full use of an innovation as the best course of action available and rejection is a decision not to adopt an innovation' (Rogers, 1983, p. 10). Diffusion is '...the process by which an innovation is communicated through certain channels over time among the members of a social system' (Rogers, 1983). Innovation is '...an idea, practice or object that is perceived as new by an individual or another unit of adoption' (Rogers 1983: p. 11).

Tornatzky and Klein (1982) found that three characteristics (relative advantage, compatibility and complexity) have the most consistent significant relationships to the adoption of innovation. Davis (1989) found that perceived usefulness is a strong correlate of user acceptance. Similarly, Premkumar et al. (1994) indicated that technological factors such as compatibility, relative advantage and cost have a great influence on the use of electronic data interchange (EDI). As has been noted, the most critical problems are not technical but are related to organisational and implementation issues (Markus and Keil, 1994).

A variety of factors may influence the successful adoption and implementation of IT in government organisations, including Internet-based technologies such as e-government. Existing research has shown that innovation is impacted upon by a number of influences including individual, organisational, technological and environmental factors (Kimberly and Evanisko, 1981, Tornatzky and Klein, 1982, Kwon and Zmud, 1987, Grover, 1993, Tornatzky and Fleischer, 1990, Thong, 1999). In addition to that, existing studies highlight the importance of human, organisational,

technological and environmental factors for the successful implementation of an innovation (Zaltman et al., 1973, Tornatzky and Klein, 1982, Thong, 1999).

As stated earlier, according to Hinnant (2002), modelling the acceptance of e-government technologies by public organisations requires capturing the influence of several dimensions: organisational characteristics, technological and environmental factors. To (2004) investigated organisational behaviour in e-tailing adoption using the diffusion of innovation as the theoretical base. He proposed a theoretical framework to test the new relationships among the four determinants, namely: the perceived characteristics of innovation (PCI), characteristics of environment, characteristics of organisation and characteristics of senior management.

To summarise, three factors – environmental, organisational and technological – are believed to influence the successful development of e-government initiatives in public-sector service organisations. In particular, the perceived characteristics of innovation (relative advantage, compatibility, complexity and cost), organisational factors (management support, IT capability, size and e-government champions) and environmental variables (external influence, policy and legal framework) – as indicated by arrow lines in Figure (1) – will be considered the influencers for the successful development of e-government projects among public-sector service organisations. Accordingly, the perceived characteristics, organisational and environmental factors of innovation will be considered from a holistic point view. In this research, it was decided to equate the term "innovating" to "technological".

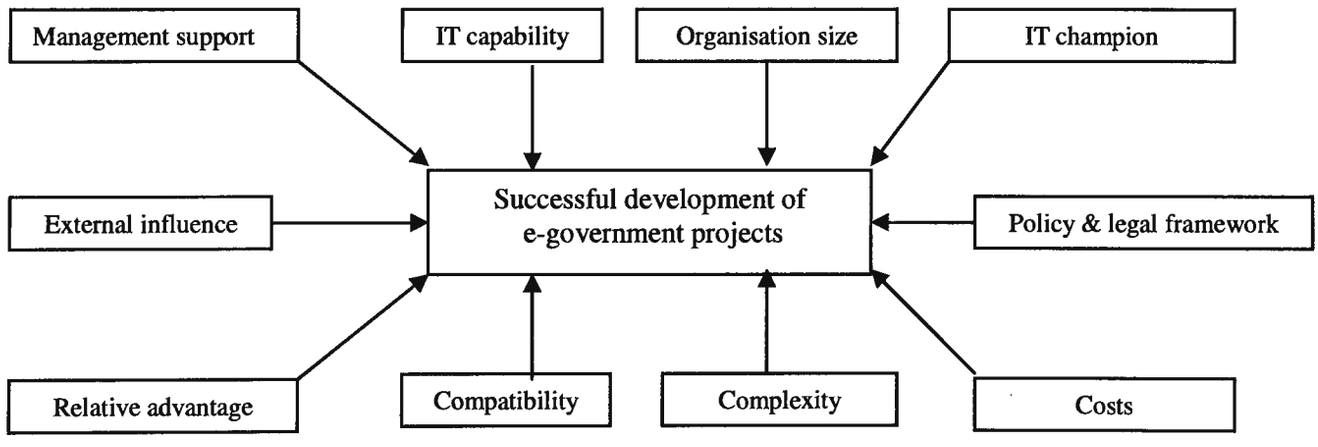

Figure 1: Research Model

(Adopted from Akbulut, 2003; Carter & Belanger, 2004; Hinnant, 2002; Moon, 2002; Tornatzky & Fleischer, 1990 and Rogers, 1995)

In brief, the research investigated only these success factors for e-government development initiatives (refer next section) but as noted, some may overlap with, and thus be informed by, 'general' IT diffusion of innovations theory.

2.4 Perceived characteristics of innovation

Rogers (1995) identified five attributes of innovation that determine its adoption. These attributes include relative advantage, compatibility, complexity, observability and trialability, which have been utilised extensively by many researchers in order to explain the adoption and diffusion of IT innovations. Among these attributes, only relative advantage, compatibility and complexity have been consistently identified as critical adoption factors (Kwon & Zmud, 1987).

The influence wielded by the characteristics of technological innovations on the adoption process has been studied frequently in the information systems literature (Huff and Munro, 1989, Cragg and King, 1993, Rogers, 1995). Tornatzky and Klein (1982) reported that relative advantage, compatibility and complexity are the most significant factors in explaining relationships between innovation types. The management information systems (MIS) literature has suggested that the characteristics of the innovation itself are important determinants of its adoption (Rogers, 1983).

This research investigated the following perceived success factors:

- Relative advantage: 'the degree to which an innovation is perceived as being better than the idea is supersedes' (Rogers, 1983, p. 213)
- Compatibility: 'the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters' (Rogers, 1983, p. 223)
- Complexity: 'the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand' (Rogers, 1983, p. 223)
- Costs of adopting and implementing e-government projects.

Each of these perceived success factors is now discussed in turn.

2.4.1 Relative advantage

Rogers (1995) defines relative advantage as 'the degree to which an innovation is seen as being superior to its predecessor'. Several benefits are mentioned repeatedly in e-government studies of Web-enabled ways to deliver services to citizens and businesses while reducing costs. Although the exact number of Internet users may vary from one study to the next, people are simply getting on-line very quickly. Internet use has been the medium for transforming the way government works (Ho, 2002). By way of illustration, e-government enables organisations to lower their operating costs, provide faster service to clients and eliminate redundant IT development across agencies (Goings *et al.*, 2003). Perceived relative advantage, image and compatibility were found to be significant factors in predicting the intention of citizens to use state e-government services (Carter and Belanger, 2004). According to Gichoya (2005), the perceived benefits of implementing e-government initiatives tends to be used to judge the success of these initiatives. He indicated that the observations of benefits such as easier communication, networking, and system integration would perceive the projects as a success.

2.4.2 Compatibility

Compatibility refers to 'the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters' (Rogers, 1995). Prior research in the DOI literature has shown that compatibility with existing practices, values, or norms can be a key factor in the decision to adopt new innovations (Tornatzky & Klein 1982). In other words, innovation research emphasises the importance of the organisation's internal change in order to adopt a new innovation (Premkumar and Ramamurthy, 1995). In addition to that, innovation characteristics are dependent on the perceptions and attitudes of the users and adopters who have interaction with the technology (Hinnant, 2002). As has been noted, higher levels of perceived compatibility are associated with increased intention to adopt state e-government initiatives (Carter & Belanger 2004).

2.4.3 Complexity

Complexity is 'the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand' (Rogers 1995). Conversely, some

have defined complexity as the degree to which participation in electronic information-sharing projects is perceived as a relatively difficult process (Moore & Benbasat, 1991). Similarly, complexity in DOI is comparable to the Technology Acceptance Model's (TAM) perceived ease of use construct (Davis, 1989).

It is widely acknowledged that complex technologies require more skills and effort and therefore reduce the likelihood of the adoption of those technologies. Research within the DOI literature has shown that compatibility with existing practices, values, or norms can be a key factor in the decision to adopt new innovations (Tornatzky & Klein 1982).

2.4.4 Costs

The factor of costs was highlighted by Tornatzky and Klein (1982) as it has been in several earlier innovation studies cited by them. Liao and Cheung (2002) stated that the electronic delivery of public services results in cost savings including savings to both the individual and the organisation providing the service. The implementation of e-government is an expensive task for which governments have to prepare. Many state and local governments have had to reduce staff numbers and drastically cut services in an attempt to balance their budgets (Williams, 2003). According to Williams, the costs of e-government can be broken down into several major areas such as personnel, infrastructure and consulting. Additionally, there will be 'soft' or hidden costs, such as the time it takes staff members to become familiar with the new system.

Most cost-benefit estimates have considered only the operational costs of e-government portals. As e-government projects are IT-intensive, the initial investments are extremely high and they strongly affect the overall profitability of the project. It is therefore important to account for all cost categories, both initial investment and operational expenses. These cost categories extend to the explicit costs incurred in adopting e-government projects, including those for hardware and software acquisition as well as training and personnel costs for maintenance.

2.5 Organisational factors

Organisational factors refer to the internal characteristics of a public organisation that may affect its adoption of e-government projects (Hinnant, 2002; Moon, 2002; Leonard-Barton & Deschamps, 1988; Tornatzky & Fleischer, 1990; Premkumar & Ramamurthy, 1995). Environment tasks, structural characteristics, technical capacity and IT implementation are among the organisational factors that affect the adoption of innovation (Iacovou et al., 1995, Tornatzky and Fleischer, 1990, Premkumar and Ramamurthy, 1995). Abdul-Gader and Anangari (1994) related the failure of IT systems in the Arabian Gulf region to many factors, among which was lack of management support for IT.

In addition, political leadership, support and will are essential to implementing the cultural change necessary to deliver e-government (Hinnant 2002). Moon (2002) argued that the size and type of municipal government are significant institutional factors in the implementation and development of e-government. In addition, institutional size could play a role in the level of organisational acceptance of Internet-based technologies, especially e-government initiatives (Hinnant, 2002). The organisation provides a rich source of structures and processes that constrain or facilitate the adoption of innovations (Slyke *et al.*, 2002).

As illustrated by the existing literature, senior management's commitment to, involvement with and participation in defining and delivering IT systems are linked to the acceptance and success of such systems. Prior research in the diffusion literature has presented a positive relationship between organisation size and innovativeness (Rogers, 1995). Davenport et al. (2003) provided an overview of the kinds of people in organisations who are potential sources of innovation. The authors outlined personal characteristics of individuals who are responsible for introducing new ideas and bringing about organisational change. In addition, the authors emphasised that organisational practices such as top management support of innovation can encourage the adoption of innovation.

As per Becker at al. (2004) study, the factors that have influence on e-government success are organisational responsibility for e-government, e-government awareness, funding and organisational change. It is thus evident that there are many organisational enablers that can have positive impacts on the development of e-government projects. As the current study is an exploratory research in the first

instance, the researcher decided to limit the investigation to only four organisational success factors which are:

- management support
- IT champions
- IT capability
- Organisation size.

Although there are many organisational factors that could influence the success of e-government projects including the organisational culture, organisational power and control, organisational change, etc., this study focuses (as indicated clearly in chapter 1.7: Study boundaries) only on the four organisational factors of top management support, IT capability, organisation size and IT champion. The rationale behind such a decision was to limit the investigation to a manageable number of organisational influencers alongside other environmental and perceived factors.

The study's perspective of e-government is also limited to the delivery of goods and services and does not consider other aspects such as e-governance or e-democracy. The study does not survey citizens' perception about adopting e-government but rather focuses on the public-sector decision-makers who are in charge of such projects.

2.5.1 Management support

Senior management is instrumental in creating the necessary environment for successful IT implementation. According to Markus (1983), management support can overcome political resistance and encourage participation throughout the organisation. Van de Ven et al. (1999) recommended that the best way to prevent resistance from senior officials during the introduction of a new innovation would be to involve them in the innovation process. Leonard-Barton and Deschamps (1988) maintained that certain organisational factors, such as managerial influence, may affect IS adoption.

Hoffer and Alexander (1992) asserted that top management who push for the adoption and implementation of new technology are important facilitators. Managerial commitment is a critical influence on the uncertain process of adoption by facilitating solutions to the numerous contingencies that arise during the various stages of implementation (Sabherwal and King, 1995). Among the key factors that influence

the successful adoption of innovation include leadership and political will (Kaaya, 2004, Al-Ruzaiqi, 2003). Those two factors would need to be applied in the same manner for the successful implementation of e-government services.

Likewise, Selman (2002) maintained that innovation and leadership are linked, in that leaders must be the initiators. Support from the highest level of an organisation is an important factor in implementing successful e-government initiatives. Macintosh and Fraser (2003) argued that understanding the environment of trust relationships between organisations and users will enable the social acceptance of e-government and thus the acceptance of those services delivered electronically. Without such acceptance, the value of e-government is minimised. Alshawaf and Khalfan (2004) found that lack of top management support, privacy of information and security issues were the major factors inhibiting the successful adoption and acceptance of e-banking in Oman.

In short, the support and involvement of senior management are critical for the successful implementation of e-government projects – especially in the early stages of project commissioning. Therefore, top management support would be an essential element in creating the necessary environment for successful IT implementation.

2.5.2 IT champions

Moch and Morse (1977) emphasised the importance of experts within an organisation who value the benefits of innovation and accelerate the decision to adopt it. Hoffer and Alexander (1992) asserted that champions are important to encourage the adoption and implementation of new technology. The leadership and enthusiasm of individuals within organisations have driven many e-government advances in many countries, for example Dubai. The Dubai e-government project was established in 2000 with strong support from the government's senior management and it has been recognised that IT-knowledgeable people in the Dubai e-government team have driven the great success of their e-services initiatives for the last five years.

Basically, IT champions are the people who push for the success of technological initiatives and guide the implementation of such initiatives towards successful completion (Al-Qirim, 2004). Therefore, the presence of IT champions within an organisation is essential for a successful development of e-government

initiatives and leadership is needed to promote the acceptance of e-government concepts and benefits as well as set implementation frameworks in place.

2.5.3 IT capability

Information technology capability refers to the ability of an organisation to leverage its assets in order to fulfil its IT-related strategic objectives (Bharadwaj *et al.*, 1999). Empirical evidence suggests that the more knowledge employees have of the technological innovation, the more extensively they are likely to use that innovation (Ettlie, 1990). Van de Ven et al. (1999) claimed that knowledge and skills are necessary for both the implementers of the innovation and its users in order to gain effective access to, use of and benefit from, that innovation. That necessarily involves training the staff of government organisations to handle the implementation phase of e-government services effectively and facilitate smooth service transactions.

It is believed that e-government increases the need for ICT-related skills in government organisations (Al-Mashari and Zairi, 2000). Therefore, the skills required for e-government are not merely technical, as general managers also need broad skills to engage in the ICT decision-making process. Among these skills are a basic technical understanding, an understanding of information management and of the information society as a whole. Gant (2004) asserted that the integration of human, organisational and information technology capabilities is essential to a successful implementation of e-government projects.

Therefore, managers must be able to lead the organisation's IT department and outside partners; they must also be able to integrate the organisation's ICT strategy with its broader goals. Furthermore, traditional management skills need to be updated and strengthened to deal with the impact of e-government.

2.5.4 Organisation size

Prior research within the DOI literature has consistently shown a positive relationship between organisation size and innovativeness (Rogers, 1995). Because adoption of applications involves significant technical hurdles and complementary changes to business processes, an organisation's size will be a most important factor in mitigating these barriers. Thong (1999), in a study of Singapore businesses, found that

business size and employees' IT knowledge were significant predictors of IT adoption. Age, size, and organisational structure (specialisation or centralisation) were seen to have an impact upon the adoption of technological innovation in Kimberly and Evako's (1981) study of technology adoption by hospitals.

Moon (2002) emphasised that the size of the municipality and type of municipal government are significant institutional factors in the implementation and development of e-government. He claimed that the larger governments tend to be more proactive and strategic in their e-government efforts. Additionally, smaller municipalities report that they lack the technical, personnel and financial resources essential for e-government expansion (Moon, 2002). However, Moon's study neglected the political and organisational concerns of smaller municipalities.

Salmela and Turunen (2003) suggested that organisation size, implementation horizon and environmental turbulence are important indicators for the successful implementation of information technology. According to Hinnant (2002), institutional size could play a role in the level of organisational acceptance of Internet-based technologies, especially e-government initiatives. Forman (2003) illustrated the importance of size on the adoption of new technologies such as Internet adoption by individual firms for business use in the late 1990's.

2.6 Environmental factors

The main barriers to the delivery of e-government are not technical or legislative: they are cultural and social. External pressure to adopt Internet-based technology such as e-commerce and e-government can come from an organisation's environment in several ways (Leonard-Barton & Deschamps, 1988). Lenk (2002) classified two barriers to the successful implementation of e-government: lack of clear vision and lack of cooperation between government organisations. In addition to these barriers, Selman (2002) argued that innovation and leadership are related, in that leaders are usually the ones who promote the innovations within their organisations.

Among the key factors that influence the successful adoption of innovation are leadership and political will, as leaders have the power to commit necessary resources to enhance adoption (Forman, 2003). Ho and Ni (2004) concluded that the perceived characteristics of e-government services, peer influence, internal political support and external consistency pressure have an influence on an organisation's decision to adopt

or reject e-government services. 'The success of e-government initiatives and processes are highly dependent on government's role in ensuring a proper legal framework for their operation' (OECD, 2003). This research investigates the following success factors:

- external influence
- policy and legal framework.

2.6.1 External influence

Danziger and Dutton (1977) stated that external governments, particularly federal agencies and departments, have experimented with various forms of assistance for local EDP in the USA. Primarily these interventions by federal and state agencies have taken the form of direct financial support for hardware, software, or personnel development. Competitive pressure occurs when industry diffusion forces firms to adopt new innovations in order to maintain their competitive position (e.g. (Iacovou et al., 1995). However, Thong (1999) suggested that competition does not provide a direct 'push' for small businesses to enhance their adoption of information technologies.

External pressure to adopt Internet-based technology such as e-commerce and e-government can come from the organisation's environment in several ways (Forman, 2003). Forman reported the importance of external pressure on the adoption of new technologies, such as adoption of the Internet by organisations that realise the benefits of such adoption. An important organisational factor influencing the adoption of IT within a small firm may be social pressure to use the technology (Runge and Lee, 2000). Within the existing literature the impact of external environmental forces on the decisions that organisations make is well-recognised. Various aspects of the external context have an impact on the decisions by government organisations about making IT investments.

An increase in demand for government services online is obvious from the private sector as it undergoes the implementation of the e-commerce concept. For example in Oman, the Petroleum Development Oman (PDO) Company was a pioneer in adopting e-tendering initiatives and may well be keen to see other public-sector organisations adopting e-government services. Other pressures could take the form of demands by citizens and the business sector as they see nearby countries

implementing e-government projects, such as Dubai's e-government services. Another aspect of external pressure on public organisations could be the competitive pressure from other public-sector organisations, which could play an important role in an organisation's decision to initiate e-government projects.

2.6.2 Policy and legal framework

According to the existing e-government literature, an organisation's decision to adopt e-government can be attributed to both internal and external forces. Berry (1994) suggested that an agency's political leadership and policy could be important determinants of innovation acceptance and use. The adoption of e-government in some organisations may be determined by their socio-economic or political conditions. On the other hand, some organisations may target to adopt e-government projects simply because others have already done so. Successful e-government depends on delivering integrated services and the main barriers to the delivery of e-government are not technical or even legislative; rather, they are cultural and social.

E-government has the potential to improve and simplify collaboration across agencies and organisations (OECD, 2003) but the benefit is counterbalanced by regulatory barriers such as rules of accountability or the authentication of digital documents. Believing it is possible to set up e-government solutions without changing current legislation is a Utopian way of thinking. A simple technological implementation cannot supply a complete solution and is the prelude to failure. 'The success of e-government initiatives and processes are [sic] highly dependent on government's role in ensuring a proper legal framework for their operation'(OECD, 2003).

Strong political leadership and will are critical to implementing organisational change for the delivery of e-government. The literature highlights the importance of this factor for the successful delivery of e-government projects (Internet Rights Observatory, 2004). It is an essential step towards the development of e-government to revise the organisation's legislative framework, including recognition of the legal validity of electronic documents and digital signatures. The legal recognition of electronic documents and digital signatures enables the creation, transmission and storage of digital documentation, as well as the publication and dissemination of those documents.

2.7 Literature review summary

As has been noted in the foregoing sections, the literature suggests that the decision to adopt and accept IT innovations is informed by a mixture of the perceived attributes of innovation, an organisation's characteristics and the surrounding environmental factors (Carter and Belanger, 2004, Ho and Ni, 2004, Hinnant, 2002, Akbulut, 2003, Rogers, 1995, Moon, 2002). Existing studies on the concept of e-government (Fountain, 2001; Hinnant, 2002; Ho 2002; Moon 2002; Ho and Ni 2004) largely focus only on the technological aspects of e-government projects, rather than on the social, organisational and environmental factors related to people's perceptions.

In conclusion of this review, although many studies have been carried out to analyse how public organisations use information technologies for their internal operational needs (Hinnant, 2002) and more recent studies have emerged to document the rising trend of e-government development (Fountain, 2001, Carter and Belanger, 2004, Ho, 2002, Moon, 2002, Ho and Ni, 2004). None of these above referenced studies has investigated the influence of organisational and environmental factors on the adoption and diffusion of e-government features and online services. For e-government initiatives to be a success will require broader perspectives and more than technological applications. It will require transforming the way government organisations work to a new way of thinking.

Therefore, this study attempts to fill in this gap by means of identifying the factors in successful e-government implementation, taking into account the three broad dimensions of technological (perceived characteristics of innovation), organisational and environmental variables.

Next chapter, the overall research methodology applied to carry out this research is explained. The methodology chapter highlights the various research approaches, research design, data collection methods and the data analysis strategy.

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3 METHODOLOGY

This chapter provides an overview of the procedures used to conduct the study and discusses the research methodologies used to explore the research objectives. It begins with an explanation of why the case study was used as a methodology to investigate the factors for the successful development of e-government projects. Justifications for the use of a case study methodology to explore the research questions further are also given. The data collection process is discussed and finally, the data analysis strategy that was employed to increase the validity and reliability of the findings is explained.

3.1 Research approach

There are various research approaches that can be taken when dealing with information systems (IS) research. The two main types of research approach are the positivist and the interpretative, the positivist approach being the most widely used while the interpretative approach has become more popular recently (Orlikowski and Baroudi, 1991). A third option is the critical approach (Patton, 2002) which is a combination of the positivist and interpretative approaches; it combines objective scientific data with subjective human observations. The limitations of using one research perspective can be addressed by using an alternative approach that compensates for the other's weaknesses.

The primary epistemology guiding IS and e-business research falls within the positivist and interpretative paradigms (Myers, 1997). The positivist paradigm attempts to test theory by drawing inferences and testing hypotheses with quantifiable measures of variables. By contrast, the interpretative paradigm attempts to understand phenomena via the meanings which people assign to them and, in the context of IS research, focuses on understanding the context of a particular problem and the process by which this problem or issue influences its context.

Historically, information systems research has mostly followed the positivist approach but recently the interpretative approach has gained more recognition as a valid and useful research tool. Quantitative research is usually associated with a positivist approach, whereas qualitative research is associated with an interpretative approach. While positivism and interpretivism are theoretically independent of

quantitative/qualitative, quantitative research is usually associated with a positivist approach, whereas qualitative research is associated with an interpretative approach.

It is generally believed that the interpretative approach has gained recognition as a valid and useful research approach (Lee, 1991). It has allowed the scope of research in information systems to be increased but has created a split between the two types of research, thus forcing researchers to choose between the two approaches.

The main difference between the two approaches is that positivist research seeks to highlight the similarities in the data, while interpretative research highlights the differences between the data (Haskins and Jeffrey, 1990). Another difference between the two approaches is that quantitative research seeks to analyse and statistically interpret the data with little regard to why or how the phenomena occur. Qualitative research focuses more on how and why the observed phenomena occur, rather than gaining hard scientific evidence to substitute and prove assertions concerning the phenomena.

3.2 Research methodology

Research methodology is a 'structured set of guidelines or activities to assist in generating valid and reliable research results' (Mingers, 2001). Myers (1997) defined the research method as a way or strategy for data collection. Kaplan and Duchon (1988) stated that no one research approach can provide the richness that the discipline of information systems needs for further advancement.

There are various research methods available for IS research and it is common practice for a researcher to use multiple methods during an investigation, as a way of confirming findings. Previous studies (Grover et al., 1993, Gable, 1994, Pinsonneault and kraemer, 2001) have shown that surveys are the most common method used in IS research, although other methods include field experiment, action research, laboratory experiments, grounded theory, mathematical modelling, case study and ethnography. The research approaches are closely related to the types of research methods which include both qualitative and quantitative. Critical reasoning is an approach that combines the strengths of the three methods into one well-rounded research method.

Within the IS research community several authors (Kaplan and Duchon, 1988, Gable, 1994, Lee, 1991) have stressed the need for combining quantitative and qualitative research methods to investigate a research phenomenon. Mingers (2001)

also argued that a combination of research methods will yield better research results. Using a mixed-method research approach would enable the researcher to triangulate over methods.

While the majority of IS researchers prefer employing either a quantitative or qualitative methodology in isolation, there has been an increasing number of studies that advocate the benefits of combining more than one research method (Gable, 1994). Kaplan and Duchon (1988) pointed out that combining quantitative and qualitative methods instates both testability and context into the research. Using multiple methods increases the robustness of results because findings can be strengthened through cross-validation. Moreover, combining these methods may lead to a greater understanding of the subject under investigation. Therefore, the rationale behind using the quantitative research data was to enhance the understanding of the qualitative research data.

3.2.1 Quantitative research

Quantitative research is 'generally characterised by a methodology of formulating hypotheses that are tested through controlled experiment or statistical analysis' (Kaplan and Duchon, 1988). Examples of quantitative methods include surveys, laboratory experiments, formal methods and numerical methods such as mathematical modelling (Myers, 1997). As stated earlier, a quantitative research approach is usually associated with positivist research; this is because positivists use scientific research approaches to draw statistical conclusions from the data. Quantitative research involves the objective observation and scientific analysis of data to provide measurable statistical conclusions. However, according to Kaplan and Duchon (1988), quantitative research may ignore the political, cultural and social construction of the variables studied.

3.2.2 Qualitative research

Qualitative research 'involves the use of qualitative data to understand and explain social phenomena' (Myers, 1997). Examples of qualitative methods include action research, case studies and ethnography. The most common qualitative data collection methods include observations, interviews and questionnaires, documents and texts,

and the researcher's impressions and reactions (Myers, 1997). Lee (1991) illustrated that qualitative research methods are described by their interpretative perspective, which assumes that the methods of natural science are inadequate to study social reality.

A researcher who employs an interpretative view takes into account that many of the issues surrounding the research, particularly in the area of IS research, are caused by a multitude of human factors which tend to affect the research results. Instead of the test subjects being treated as objects, human factors are taken into account in order to gain greater insight into the research and obtain more accurate and useful results. Interpretative researchers believe that human factors cannot always be measured quantitatively and so the research is far more subjective. This leads to the researcher becoming more actively involved in the research process which is usually conducted in a more social environment.

A qualitative researcher usually observes and records the data and then tries to interpret those data in order to draw conclusions. A qualitative research approach thus leads to less statistical explanation of the findings but gives a much better understanding of why the findings occur and better explanations of the observed outcomes (Kaplan and Duchon, 1988). When conducting qualitative research, the researcher usually begins by having observed certain phenomena and then sets out to interpret those observations to create and prove a theory.

Qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. The empirical data produced by the 'softer', interpretative methods are regarded by many quantitative researchers as unreliable, impressionistic and not objective (Kaplan and Duchon, 1988). Qualitative researchers believe that rich descriptions of the social world are valuable, whereas quantitative researchers are less concerned with such detail (Kaplan and Duchon, 1988). Generally, a quantitative researcher starts out with a theory in mind and seeks to test that theory using statistical analysis, while a qualitative researcher develops and changes the theory as the research proceeds, seeking to establish the links between the observed data.

3.3 Research design

3.3.1 Case study research

The various research designs include field studies, case studies, laboratory experiments, surveys and action research, and each research strategy determines what types of data and results it is possible to obtain in a study. According to Yin (1994), 'a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used' (p. 23). Yin also stated, 'case studies are the preferred strategy when how and why questions are being posed' (p.13). Yin recommended the case study approach when the research focuses on answering 'how or why questions', whereas the survey method is more suitable for research driven by 'who, what, and where questions'. Case study research involves systematically gathering information about a particular person, social setting, group, organisation, or an entire community to afford the researcher an effective understanding of how it operates or functions (Berg, 1995). Case studies can be based on any mix of quantitative and qualitative evidence.

Qualitative research has gradually become more widely accepted in organisational and IS research. There are three factors favouring case study research as a viable IS research strategy: a study of a natural setting; a strategy that enables the researcher to understand the complexity of the process taking place; and an appropriate research strategy where no previous research has been done (Benbasat *et al.*, 1987).

In recent years, case study research has become a popular methodology in the IS domain and has been used by many researchers such as (Lee, 1991, Mingers, 2001, Markus, 1983, Benbasat et al., 1987, Dube' and Pare', 2003, Lee, 1989, Orlikowski and Baroudi, 1991, Alavi and carlson, 1992, Norris, 2003). It is evident that case study research is highly relevant in the IS field as the objective is to study information systems within the organisation, focusing on the organisation itself rather than the technical issues at hand (Benbasat, Goldstein et al., 1987). Case studies involve the examination of a small number of defined entities and investigate a phenomenon in a real-world context.

Further, case studies are suitable for the exploration, classification and hypothesis development stages of the knowledge-building process (Benbasat,

Goldstein et al., 1987). Additionally, the case study approach serves as an excellent tool to provide additional support for the findings of the statistical analysis and additional factors that were been missed during the questionnaire data collection.

Yin (1994) highlighted that generalisation of results is made to theory and not to populations. Multiple cases strengthen the results by replicating the pattern-matching, thus increasing confidence in the robustness of the theory.

Based on the objectives of the research – which are to identify the factors for the successful development of e-government initiatives within public-sector service organisations in Oman – a case study research method was found to be an appropriate method to employ. It should be noted that, while the study's research questions are not expressed in 'how' and 'why' form, they can easily be rewritten as such. The study used both quantitative and qualitative techniques to investigate the factors for the successful development of e-government initiatives in public-sector service organisations. The quantitative technique included the collection and analysis of questionnaire survey data from public-sector officials. The qualitative study gathered qualitative data, mainly from semi-structured interviews with government officials, to support the findings of the quantitative data analysis as well as to identify additional variables. Figure 2 below shows the research design specified for this study. It is worth mentioning that this research project has a practice-driven objective rather than being theory-driven alone.

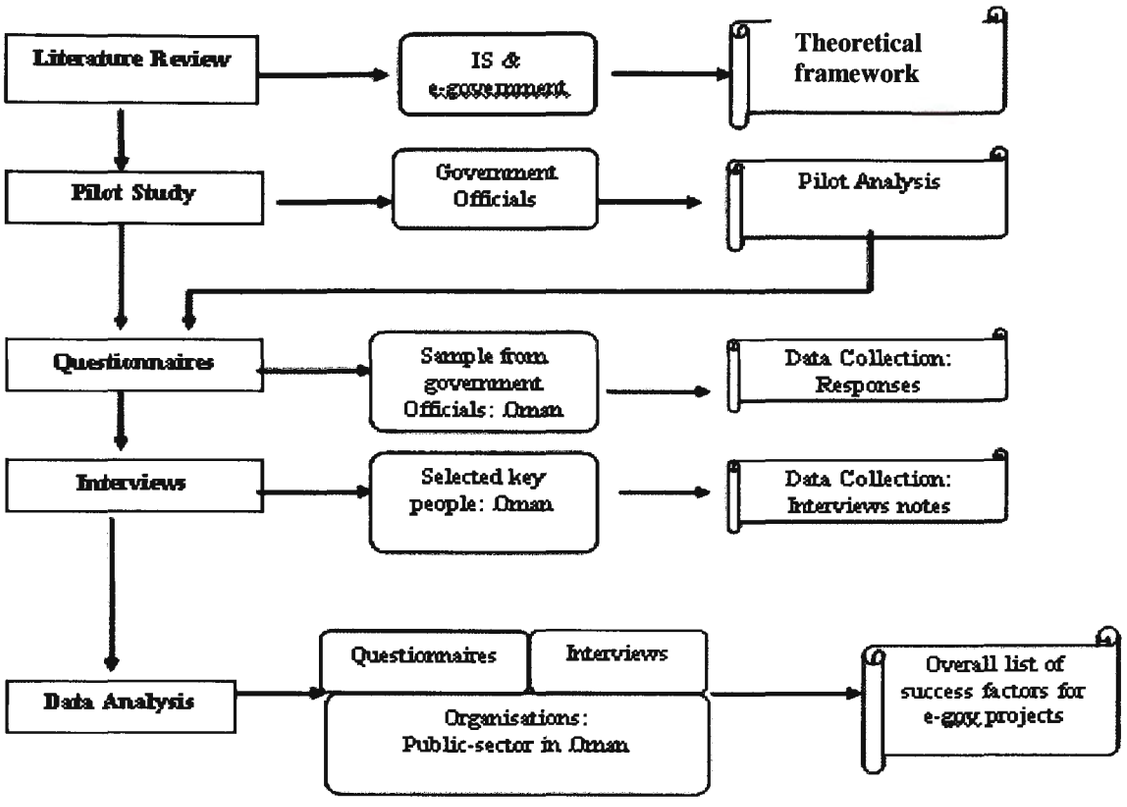

Figure 2: Research Design Process

3.4 Data collection methods

According to Benbasat, Goldstein et al., (1987), multiple data collection methods are typically employed in case study research. Essentially, this research involves a case study with an embedded survey. The methods selected for collecting the required data were a questionnaire and semi-structured interviews. The mixed method of employing survey data with a number of interviews to complement qualitative data has become accepted in IS research and adds to the critical trail of evidence required to triangulate with the qualitative data (Gable, 1994). The rationale is that by triangulating over methods the researcher be able to enhance the understanding of the qualitative data, in addition to the statistical tests.

The advantage in proceeding with multiple data sources is that such a strategy develops converging lines of inquiry and triangulates information among various sources (Yin, 1994). The triangulated approach allows the researcher a critical and objective evaluation of the credibility and consistency of each piece of information collected.

In general for government employees, the survey includes what functions and services they have currently implemented for e-government services, what they are

planning for new services, and what measurable data they have gathered about existing e-government initiatives. The survey questionnaire and interviews were intended to capture general data on respondents' perceptions on the possible factors (e.g. management support, IT capabilities, organisation size, IT champions, relative advantage, compatibility, complexity, costs, external influence, policy and legal framework) affecting the successful development of e-government projects.

The data collection methods employed in this study are explained in the following sections.

3.5 Data collection method: quantitative data

Gathering of quantitative data is usually related to survey research. Kraemer, Danzinger et al., (1993) stated that 'survey research is both the most widely used and most widely questioned method in the MIS field'. Orlikowski and Baroudi (1991) reported that 49 per cent of their research analysis sample was made up of surveys, whereas the share of case studies was 14 per cent.

As cited earlier, Kaplan and Duchon (1988) have defined quantitative research as 'generally characterised by a methodology of formulating hypotheses that are tested through controlled experiment or statistical analysis'. Survey research is one of the most effective techniques available for the study of attributes, values, beliefs and motives, and is one of the most popular methods used by IS researchers (Newsted *et al.*, 1998). The main advantage of survey research is that it provides the researcher with a quantitative method for establishing relationships and making generalisations about known populations. Given the purpose of the quantitative information required for this study, survey research was found to be the most appropriate data collection method.

The quantitative survey method has three characteristics (Haskins and Jeffrey, 1990). First, a survey has to produce quantitative descriptions of some aspects of the population under study, either leading to uncovering of relationships between variables or projecting findings descriptively to a predefined population. Second, the survey is a method based on structured and predefined questions. Third, information is generally collected from a fraction of the study population and it is collected in such a way that results from the sample can, hopefully, be generalised to the study population.

According to Hakins & Jeffrey (1990), survey research offers the opportunity to record a snapshot of the characteristics, actions and opinions of a specific group of people at a particular point in time, from which quantitative analytical inferences can be made. According to Ahluwalia (2002), researchers favour the use of surveys for collecting data as they are easily administered, simple to score and code, and offer the ability to study a large lumber of variables in a real-world context. Surveys do not, however, give any insight into the causes of processes behind the phenomenon being studied. Survey methodology provides a basis for establishing generalisability, allows replicability and has statistical power.

Once the conceptual model was defined for the factors proposed to governing the successful development of e-government projects, a survey instrument was developed to collect data from the appropriate constituent populations based on each conceptual model's attributes. The survey incorporates a representative sample from a diverse set of government employees and citizens (mainly students from the Sultan Qaboos University) to validate model components, component relationships and attributes. The quantitative study includes the collection of questionnaire survey data from public-sector organisation officials to test the research constructs.

The survey method was deemed appropriate for a number of reasons, including that the objective of the quantitative study was to test research variables in order to gain an understanding of the factors that could lead to a successful development of electronic government initiatives. Therefore, it was necessary to employ a methodology that permitted theoretical propositions to be tested in an objective fashion. It was also important to use a methodology that would test the relationships between constructs to be determined in a systematic way.

In addition to the above, in order to obtain a reasonable sample size for statistical testing of the research model variables, it was necessary to obtain data from a large portion of the selected sample. Using a survey research methodology, the researcher can describe large and heterogeneous populations more efficiently and economically. Therefore, in order to answer the research questions and test the relationships between research model variables, the survey methodology was an ideal tool. Specifically, the purpose of the quantitative study was to test the proposed research constructs to gain an understanding of the factors that could lead to the successful development of e-government projects.

3.5.1 Questionnaire design

The aim of the questionnaire was to collect data from a large number of respondents to quantify the possible factors influencing the successful development of e-government initiatives. The questionnaire asked closed questions to force all respondents to respond with answers that could be collated. In order to get a more comprehensive view of e-government success factors, it was decided to conduct a survey of public-sector organisation employees, as they are the one who implement such IT projects in the first place.

Although all the research constructs were operationalised using multi-item scales from previous studies (Akbulut, 2003, Moore and Benbasat, 1991), many of those scales were modified to reflect the study context, i.e. e-government development projects. Items in the form of statements assessing relative advantage, compatibility, and complexity were adapted from Moore and Benbasat (1991). The statements were modified to reflect perceptions of the factors in successful e-government development. Also, some items used in the questionnaires were obtained from existing scales whenever possible. To ensure that the measurement scales were adapted appropriately, the researcher conducted a preliminary test with one government official interested in e-government projects and one staff member of Victoria University. Slight changes in the wording of the questionnaire were then implemented. The above mentioned references were used as the contributors to the survey development for this research.

The respondents' perceptions of the factors for successful development of e-government initiatives were assessed from three perspectives: (1) the technological (relative advantage, compatibility, complexity and costs); (2) the organisational (top management support, IT capability, organisation size and IT championship); and (3) the environmental perspective (external influence, political and legal policy). From the technological perspective, an organisation prepares for e-government by devising enterprise-wide e-government strategies in line with current business strategies and plans. From the organisational perspective, an organisation must ensure that the design, development and deployment of all e-government functions are carefully planned and coordinated. Finally, from the environmental perspective, the types of factors that might influence the success of e-government projects are considered, such as external influence from the surrounding countries or even from currently existing projects, in addition to the level of political and legal requirements. Questionnaire

Items 2 to 27 correspond to the technological variables, items 28 to 39 correspond to the organisational level, and items 40 to 51 correspond to the environmental level. In the questionnaire, respondents were asked to score on a 5-point Likert-type scale with the endpoints being 'strongly disagree' and 'strongly agree'. The dependent variable, e-government development, was assessed by a set of measures about the willingness to develop successful e-government projects. The ranged 'tick-box' format helped respondents to answer simply and objectively, also simplifying the process of statistical analysis as explained in the data analysis chapter.

Several questions sought the respondents' views on the overall factors for the successful development of e-government initiatives in general. These last open-ended questions were omitted from the statistical analysis because of their generality.

A definition of e-government was included in the questionnaire to ensure that the respondents had a common understanding of the phenomenon under investigation. This definition is the same as that presented in chapter one. The package distributed to respondents contained three items: a covering letter, an official letter from the Ministry of Higher Education in Oman (Appendix A) and one questionnaire (Appendix B). The covering letter explained the purpose of the survey and asked the respondent to complete the questionnaire within three weeks. Respondents were guaranteed confidentiality and anonymity. Each package was delivered personally and the covering letter carried the letterhead of the Victoria University of Technology. It was expected that data collection using this method would be perceived as more authoritative than the usual questionnaires received in organisations, and that accordingly this procedure would result in a better response rate.

The questionnaire was translated with blind checks into Arabic to allow people with little or no knowledge of English to complete the survey, although in fact the majority of respondents preferred to use the English version. It was decided not to employ a postal survey method as the postal services in Oman are not reliable. Therefore, the researcher decided to collect the completed questionnaires personally, with the assistance of some employees included in the selected sample of organisations.

3.6 Data collection method: qualitative data

Interviews are one of the most important sources of case study information. There are several possible forms of interview: open-ended, focused, and structured or semi-structured. In an open-ended interview, key respondents are asked to comment about certain events. They may propose solutions or provide insight into events. They may also corroborate evidence obtained from other sources. The researcher must avoid becoming dependent on a single informant and must seek the same data from other sources to verify its authenticity.

In the semi-structured interviews employed in this study, the talking-point questions were open-ended, short and to the point, requiring respondents to explain their views of the e-government development projects within their respective organisations and their own experiences, if any. As the interviews progressed, additional questions were incorporated. Conversations with officials from various ministries also helped to explain the nature of current projects, their status, and the best way to achieve the goals that had been set. Both macro-level and micro-level questions were used to gather both broad and detailed information.

In this study, semi-structured interviews were conducted with officials at all levels of government. Although the primary focus of the study is service organisations in the public sector, it was necessary to interview knowledgeable individuals in organisations involved in implementing and overseeing e-government initiatives (Muscat Municipality, Information Technology Authority (ITA) and other government ministries), to gain a better understanding of the initiatives and factors that may influence a successful development and implementation process. Specifically, interviews were conducted with government officials (decision-makers, directors-general, directors, section heads, IT managers and employees at all levels) within public-sector organisations as a way of connecting with what is actually being done in the area of e-government and what initiatives are working at a national level. In particular, the purpose of conducting the semi-structured interviews was to obtain additional support for the findings of the questionnaire results and to identify any new success factors beyond those already identified from the quantitative data results.

As a substantial part of the study depended on personal interviews, the researcher contacted known key government officials to help in determining who should be interviewed and which issues were likely to bear on the successful development of Web-based technology, such as e-government projects, within public-

sector organisations. In addition to the above advice, some interviewees were recommended by other members of their organisations as the key people having an interest in the process of introducing Web-based technology projects in their organisations. Interviewees were thus purposely selected based on their current responsibilities and sharing of similar characteristics.

The interview questions are outlined in Appendix C. All questions were directed to the interviewees in the same way with only minor revision, where appropriate, for each respondent's individual circumstances. The researcher used his knowledge and experience to determine the extent of revision needed in order to make the question more appropriate for each interviewee. The researcher decided against using a tape recorder after asking the interviewees, as that might have created some boundaries that could have blocked obtaining the desired information from the interviewees. All conversational material was recorded by the researcher using shorthand and a steno pad. The field notes were then typed on a computer, indexed and coded for later reference and analysis, as discussed in the data analysis chapter.

3.6.1 Interview guide design

Questions were asked about the organisation and the interviewee's position in his or her department before a set of questions was put to them (interview questions are reproduced in Appendix C). Each set of questions was directed to all interviewees in largely the same way, allowing for the interviewee's individual responsibilities. The researcher used his personal experience as well as guidance and suggestions from Victoria University staff to determine any revision needed to make questions more appropriate for a given interviewee. All conversational material was manually recorded by the researcher. The field notes were then typed on a computer and coded for later reference and analysis, as explained earlier.

3.7 Sampling frame

In general, sample size depends on the nature of the analysis to be performed, the desired precision of the estimates one wishes to achieve, the kind and number of comparisons that will be made, the number of variables that have to be examined simultaneously and how heterogeneous a universe is being sampled.

Deciding on a sample size for qualitative inquiry was more difficult than for a quantitative study because there are no definite rules to be followed. In purposeful

sampling, the sample should be judged on the basis of the purpose and rationale for each study and the sampling strategy used to achieve the study's purpose. The validity, meangfulness and insights generated from qualitative inquiry have more to do with the information-richness of the case selected and the analytical capabilities of the researcher than with sample size.

There are three primary kinds of samples: the convenience sample, the judgement sample and the random sample. They differ in the manner in which the elementary units are chosen. A convenience sample results when the more convenient elementary units are chosen from a population for observation. Purposeful sampling selects information-rich cases for in-depth study. Sample size and specific cases depend on the study purpose. Snowball or chain sampling identifies cases of interest from people who know people who know which cases are information-rich – that is, good examples for study or good interview subjects. Convenience sampling saves time, money and effort but it is also the poorest way of getting samples, has the lowest credibility and yields information-poor cases. Combination or mixed purposeful sampling helps in triangulation, allows for flexibility, and meets multiple interests and needs. The advantages and disadvantages the four major sampling strategies are summarized Table 1.

Table 1: Sampling Strategies

Technique	Advantages	Disadvantages
Random sampling	Theoretically most accurate. Influenced only by chance.	Sometimes a list of the entire population is unavailable.
Systematic sampling	Similar to random sampling. Often easier than random sampling.	The system can sometimes be biased.
Quota sampling	Can be used when random sampling is impossible. Quick to do.	There may still be biases not controlled by the quota system.
Stratified sampling	Ensures large enough sample to subdivide on important variables. Needed when population is too large to list. Can be combined with other techniques.	Can be biased if strata are given false weights, unless weighting procedure is used for overall analysis.

Sampling: questionnaires

The sampling frame for this study consisted of employees in public-sector service organisations in the Sultanate of Oman – more specifically, employees of those organisations which provide services to citizens and the business sector, and which have an interest in enhancing their service delivery by utilising information and communication technology. There are roughly 45 public sector organisations that provide information and services to citizens and business sector in Oman and 33 organisations provide web-based information (Information Technology Authority - Oman (2007). The reason for selecting the 14 organisations represented in the sample was that they had already developed some management information systems and information technology infrastructure for the provision of e-government services. This selection process was accomplished with input from the Information Technology Authority (ITA) in Oman, some public-sector organisations (Muscat Municipality) and the researcher. The government departments and associated e-government projects chosen led to the pool from which subjects were selected. However, the project's ethical considerations demanded that selected subjects were not obliged to participate.

The study targeted those organisations because of their readiness (in terms of IT infrastructure) as well as their intention to embark upon e-government projects. There is an urgent need in Oman for improved services from public-sector organisations when compared with the services provided by the business sector. In addition, there is a need for research directed specifically toward understanding the factors that lead to the successful implementation of e-government initiatives.

The sample was gathered from a total population of public-sector organisations based in the city of Muscat, Sultanate of Oman. Sampling parameters were outlined before the data collection commenced. The sample consisted of employees from 14 public service organisations and the Sultan Qaboos University. The reason behind including the Sultan Qaboos University, as an educational institution, in the study sample was that the students surveyed fit the profile of those most likely to use e-government services. A total sample of approximately 350 was required in order to achieve the 'rule of thumb' dictate of 30 subjects per experimental cell, and to leave sufficient additional surveys to compensate for unusable or illegible responses (Alan, 2001).

Sampling: interviewees

The researcher conducted interviews over a three-month period from June to August 2006, interviewing 16 officials. All 16 interviews were conducted in person. The challenge was to ensure a balanced and diverse representation among respondents from the public sector across a variety of job functions, but all of whom had some input in the decision-making process.

The current study depends on convenience and purposeful sampling. The use of a mixed sampling method employed respondent referrals as a means of increasing the respondent data set from each organisation. In a typical situation, the researcher inquired at the end of the interview if the respondent could provide any referrals for additional information on a particular point, or in general. This type of sampling method helped respondents to reveal interpersonal networks and the decision-making process involved in adopting or rejecting a new information technology. The disadvantage of a purposeful sample is its limited generalisability, which essentially means that limited inferences can be applied to larger groups or similar circumstances.

The interview sample was purposeful rather than random. Interviewed employees were selected from a list of public-sector service organisations provided by the Information and Technology Technical Secretariat office in Muscat. Informants were generally from upper or middle management, section heads and IT specialists who has some experience of introducing technology into their organisations.

3.8 Data analysis strategy

This section presents the analysis strategy employed for the data collected via the questionnaires and semi-structured interviews (see Figure 3). Considerations in relation to the choice of statistical methods are also presented. The unit of analysis was the totality of Oman's government services divided into the systems and processes in place at 45 specific departments. The reliability analysis was carried out using Cronbach's alpha measures.

Regression analysis was seen as the most appropriate technique to analyse the data gathered from the survey. The purpose of performing a regression analysis is to relate a response, or dependent variable, to a set of independent variables (Myers, 1997). Therefore, the results of the regression analysis data illustrate the strength of the relationship between several variables (dependent and independent). Multiple

regression analyses were conducted for model testing using SPSS as a statistical analysis package. The questionnaire data were analysed by performing the following statistical tests:

- Descriptive statistics were calculated to describe the characteristics of the respondents
- An exploratory factor analysis was conducted to ensure convergent and discriminant validity and reliability of the survey instrument
- A stepwise multiple regression analysis was conducted to test the research constructs.

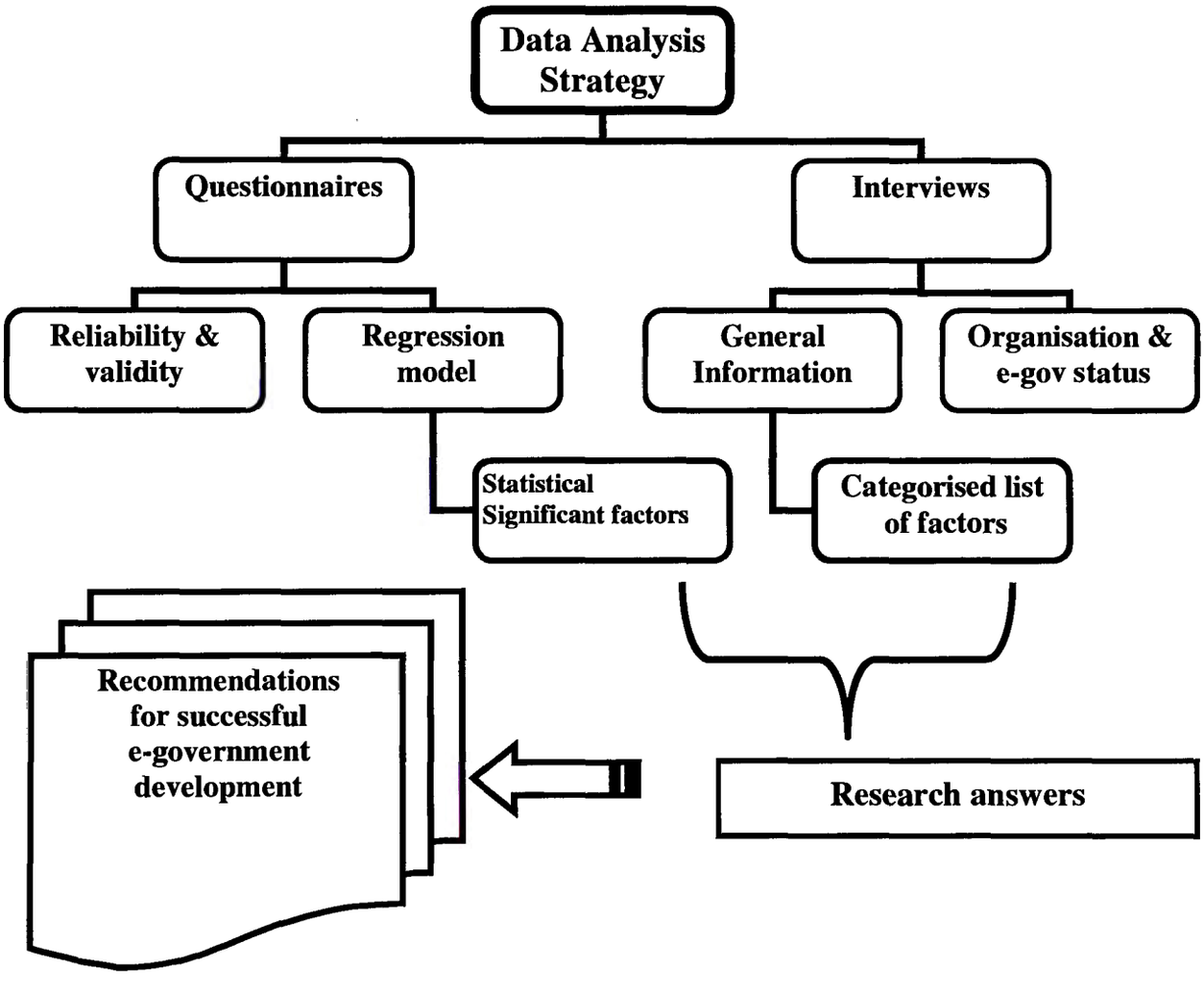

Figure 3: Data Analysis Strategy

The following chapter, chapter four, the case study under investigation is presented including a description of Oman's administrative system, its geographical

locations, economic and political situation. The chapter also presents in detail the efforts being made by the government to introduce information and communication technology projects throughout Oman in general and within public-sector organisations in particular. In addition, a more detailed description of the current e-Oman digital society project and its sub-projects including e-government initiatives is reviewed.

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4 CASE STUDY

This chapter mainly concerns Oman's demographic settings and its development of information technology projects. The first section aims to illustrate the country's geographical location, demographic structure and overall economic development. The second section documents the current information technology projects available from the public sector and ongoing e-government initiatives initiated by public-sector organisations as well as private-sector bodies.

4.1 Geographical setting

4.1.1 Geographical location

Oman is the third-largest country in Arabia with a total land area of 309,500 sq. km., bordering Yemen, Saudi Arabia and the United Arab Emirates (Figure 4). It lies on the Tropic of Cancer. As a gateway between the Indian Ocean, East Africa and the Arabian Gulf, Oman's location has always held strategic importance.

Oman overlooks the Arabian Gulf, the Gulf of Oman and the Arabian Sea where, historically, it dominated regional commodity trading. Today, it has modernised its ports to adapt to the containerised shipping that is transforming the movement of consumer goods and commodities around the world. Lying on the south-east corner of the Arabian Peninsula, Oman has a 1,700km coastline extending from the narrow Strait of Hormuz that separates Arabia from Iran in the north to its southern border with the Republic of Yemen.

The country's climate is varied, with humid coastal areas and a hot, dry desert interior. Its highest mountains, at just over 3,000 metres, enjoy a moderate climate all

year round. Although rainfall is generally light and irregular, the southern Dhofar province catches the Indian Ocean monsoon rains that fall between May and September. The monsoon season turns Dhofar into a green paradise that every year draws thousands of Arab tourists fleeing Arabia's summer heat.

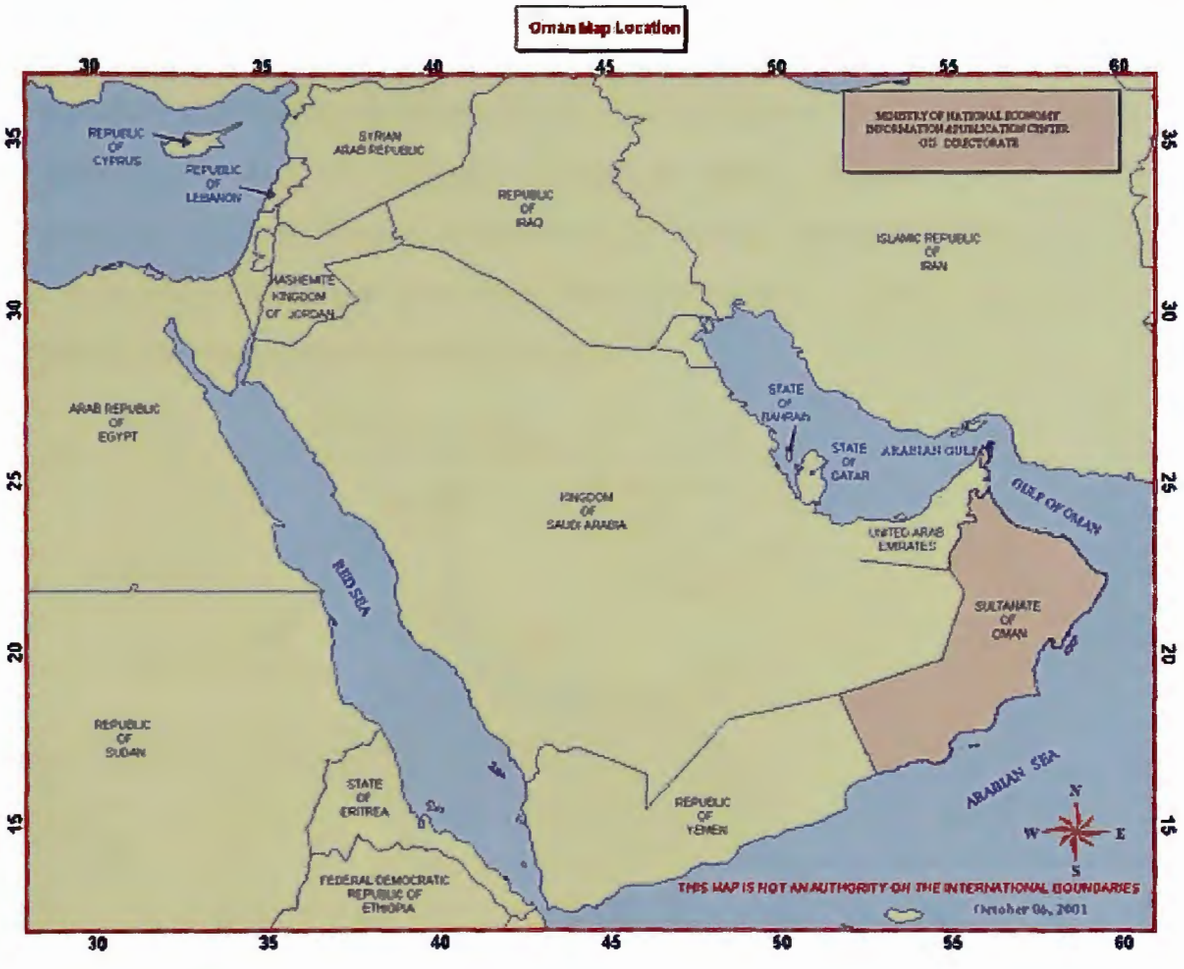


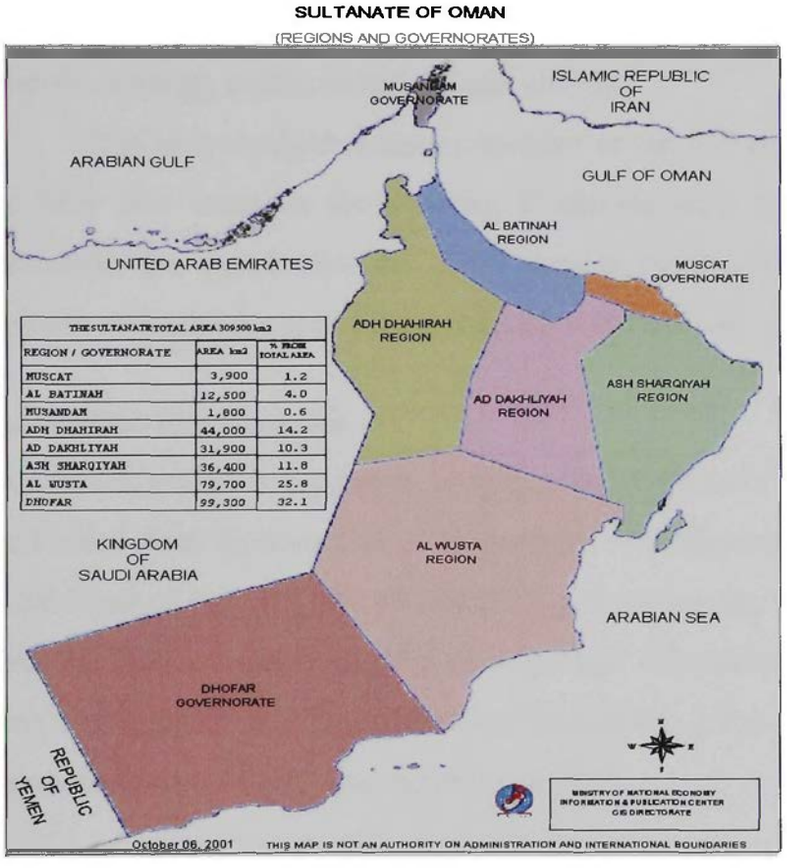
Figure 4: Oman Location Map

4.1.2 Administrative regions and population

Oman is divided into eight main administrative regions, three governorates (Muscat, Dhofar and Musandam) and five regions (Figure 5). Each region is further divided into districts headed by a district governor. According to the 2003 population census, the total population of the Sultanate is 2.341 million comprising both Omanis and expatriates. The distribution of Oman's population in urban and rural areas is 71.5 per cent and 28.5 per cent respectively. It is noted that 55 per cent of the Sultanate's population reside in Muscat Governorate and the Al Batina region.

Muscat Governorate

This is the central administrative area of the Sultanate and hence it is entrusted with the preparation and formulation of projects, programs and plans aiming at realising progress and prosperity for the whole population and in all regions of the country. It is characterised by high population density. Administratively, it comprises the Muscat Governorate and wilayat of Qurayyat with a total population of 632,000 Omanis and expatriates (Ministry of National Economy, 2004). Because of its strategic geographical position, Muscat has historically been an important trading port in the Gulf and Indian Ocean and in modern times has become the state's capital and main political, economic and administrative centre.



THE SULTANATE TOTAL AREA 309,500 km2		
REGION / GOVERNORATE	AREA km2	% FROM TOTAL AREA
MUSCAT	3,900	1.2
AL BATINAH	12,500	4.0
MUSANDAM	1,800	0.6
ADH DHAHIRAH	44,000	14.2
AD DAKHLIYAH	31,900	10.3
ASH SHARQIYAH	36,400	11.8
AL WUSTA	79,700	25.8
DHOFAR	99,300	32.1

Figure 5: Oman Administrative Map

Muscat is growing in stature as a regional and international economic centre. Seeb International Airport and the seaports of Port Sultan Qaboos and Mina al Fahal provide the main links between the Sultanate and the outside world, together with a modern system of road and telecommunications networks. Seeb Airport also provides regular access to Salalah and the smaller regional airports within Oman.

Muscat's many facilities include Sultan Qaboos University, various colleges and training institutes, schools, major commercial banks, specialist hospitals (both government-run and private), sports associations, youth clubs, museums, cultural and art centres. Its international-class hotels, imaginatively designed parks, historic and contemporary buildings, scenic beaches enhanced by a backdrop of mountains and fertile land are a delight for visitors and residents alike.

Dhofar Governorate

Dhofar has a sweeping coastline 130 km long on the Arabian Sea and an arid interior flanked by the mountains of Dhofar. On the coast is situated Salalah, the capital city of the Governorate of Dhofar. As Dhofar continues to develop while nevertheless retaining its old character, numerous projects designed to enhance the daily lives of the populace are currently under way including the expansion and upgrading of roads, schools, housing, public buildings and utilities.

This area occupies nearly one-third of the Sultanate's total area and is one of the very few areas in the Arabian Peninsula with a wide range of topographic variations. Its people (at the 2003 census numbering 216,000) are engaged in agricultural activities and fishing (Ministry of National Economy, 2004).

Musandam Governorate

Musandam, which is separated from the rest of Oman's territory by the east coast of the United Arab Emirates, is at the country's northernmost tip. It marks the entrance to the Strait of Hormuz, the narrow 55-km shipping lane between Arabia and Iran that links the Arabian Gulf with the Arabian Sea. Musandam's main towns are Khasab, Diba and Bukha. The Musandam Governorate has a low population density of 28,000 people (Ministry of National Economy, 2004).

Al Batinah Region

Al Batinah region is divided into two main areas. The coastal plain occupies the frontier with the United Arab Emirates for a distance of 270 kilometres south-east of Muscat Governorate. It is situated between the coast and the Al Hajar Al Gharby mountain range. The principal activities of the population in the area are agriculture and fisheries and it is one of the most densely populated areas of the Sultanate, with 654,000 people (Ministry of National Economy, 2004).

Dhahirah Region

The Dhahirah lies behind the western Hajar mountain range that divides the interior from the Batinah coast. The Dhahirah is a vast, semi-sandy plain stretching from the foothills of the mountains to the bleak, arid deserts of Oman's Empty Quarter, the Rub al Khali, which extend 1,100 km west towards the Saudi Arabian border. Dhahirah region has a population of 207,000 (Ministry of National Economy, 2004).

Dhakhiliya Region

This mountainous region links Muscat and the coastal plain with the Omani interior. Jebel al Akhdar is a popular destination for campers and walkers, particularly in the summer months when the altitude provides a refreshing change of weather. The towns of Nizwa and Bahla attract many tourists – Nizwa for its 17th-century fort and Friday cattle suq, and Bahla for its immense fort, with its walls and towers of unbaked brick and its stone foundations, which was inscribed on the UNESCO List of World Heritage Sites in 1988. Dhahirah region has a high population density of 267,000 people (Ministry of National Economy, 2004).

Al Wusta Region

This central region is a gravel desert that runs from the coast to the interior, where most of Oman's oil, gas and mineral reserves are to be found. It is characterised by its abundant oil and fisheries resources, which constitute the major export commodities of the Sultanate. Fishing and animal husbandry are the main occupations of its population. The region is also characterised by its unique and special environment, in particular The Arabian Oryx sanctuary with a total area of 34,000 sq. km and which was listed in the International Heritage Registry. Al Wusta region has a low population density of 23,000 (Ministry of National Economy, 2004).

Sharqiyah Region

Translated as 'eastern', this region is flanked by the gravel plains and valleys of the eastern Hajar Mountains. Further to the south-east is the Ja'alan, a vast, sandy plain stretching to the Arabian coast at Sur and Al Ashkarah. Oman's famous and isolated desert region, the Wahiba, or Eastern Sands, lies to the south. Al-Sharqya has a fairly high population density of 313,000 (Ministry of National Economy, 2004).

4.1.3 History and culture

Oman's civilisation dates back at least 5,000 years, when the country was inhabited by fishing communities and hunter-gatherer societies. Archaeological explorations are still continuing to uncover and excavate sites that shed light on the country's ancient history.

Sumerian tablets refer to a country called Magan, a name thought to refer to Oman's ancient copper mines. Mazoun, another early name for Oman, is believed to be related to its plentiful water. The name Oman is said to originate from Arab tribes who migrated to the territory from the Uman region of Yemen. Many tribes settled in Oman from elsewhere and present-day Omani families can still trace their ancestral roots to other parts of Arabia. By the Middle Ages, Oman was a prosperous seafaring nation, sending dhows from the great port of Sohar to trade with Africa, India and the Far East.

Oman's Governor

His Majesty Sultan Qaboos was born in 1940. When Sultan Qaboos came to power in 1970 the country was poor and backward, lacking roads, schools and medical care. Many of Oman's educated and wealthy citizens had left the country to seek their fortunes abroad. Sultan Qaboos' challenge was to encourage these Omanis to return home and help to turn the Sultanate into a modern, influential state.

In his first address to the nation he declared that the country would be unified as the Sultanate of Oman, with a new flag, and ended restrictions on freedom of movement. He called on Omanis who had left the country to return home in order to contribute to the challenges that lay ahead and to use their talents and expertise to modernise a once-powerful nation that had fallen into poverty and decline.

His Majesty Sultan Qaboos encourages market-orientated policies and private-sector development as the mechanism for prosperity and growth. Commercial export of oil began in 1967 and since Sultan Qaboos' accession to the throne in 1970 many more oilfields have been found and developed. There is currently only one operating oil refinery in the Sultanate, located in Muscat, but a new one has been built but not yet commissioned in Sohar.

4.1.4 Democratic principles

The Sultan's visionary and strong-willed leadership, together with the State Council represented by the people of Oman, has resulted in a sense of individual responsibility and duty towards the country's growth. The concept of decision-making and national development shared by the people and the government has always been evident in His Majesty's political thinking. To further this concept, Oman's population, both male and female, has been provided with full access to economic, social and cultural developments, with the Basic Law of the State ensuring the freedom and rights of all citizens. In November 2002 the right to vote was granted to every Omani citizen, both male and female, over the age of twenty-one years. All Omani citizens voted in the 4th October 2003 elections for the Majlis al Shura's (Consultative Council) fifth term (2004-2007). In addition to that, Omani women are increasingly being appointed to government positions, the most recent being a Minister for Tourism in March 2004.

4.2 Oman economic development

In 1970, Oman had little physical or administrative infrastructure and Sultan Qaboos faced the formidable task of turning a backward, impoverished country into a powerful modern state. Oman had begun to exploit its oil reserves in the late 1960s but had achieved little development in other sectors. Oman's services, housing and communications were basic at best. In 1996 Oman passed the Basic Law of the State, containing more than 80 articles to clarify every aspect of the state apparatus and to address the fundamental rights and duties of Omani citizens. The Basic Law guarantees the equality of all citizens before the law, freedom of religion and of speech, a free press, the right to a fair trial and the right to create national associations. It lays down a legal framework for all future legislation.

Oman enjoys a stable political, economic and social system enhanced by the excellent relationships between the Sultanate and neighbouring countries. Although 68 per cent of the Sultanate's revenues derive from oil, the economy also relies on non-oil producing sectors such as agriculture, industry, tourism, mining and fishing. Oman is an open and oil-based economy. The macroeconomic environment of Oman has been robust since 2000, driven by high oil prices, development of liquefied natural gas, public investment in infrastructure and growing diversification of the economy that has helped to moderate the dependence on oil. The fiscal position of the

government improved considerably and budgetary surpluses were used for both debt reduction and accumulation of foreign assets, leading to major improvement in the net financial asset position of the government (Ministry of Information - Oman, 2006c).

The financial system in Oman has remained stable and resilient. Sustained improvements in the regulatory and supervisory norms in line with international best practice have ensured a banking system that is well-capitalised and well-provisioned. Oman's current macroeconomic environment, particularly its low inflation, comfortable reserves, stable exchange rate and strong financial system, make the country an attractive destination for foreign investment (Samstag, 2004).

Oman's economic policy-making draws on a series of five-year plans that set objectives for all government sectors. Economic planning evolves from a consultation process with inputs coming from government and non-government bodies, and the Ministry of National Economy draws up the five-year development plans. By 1995, Oman had completed four five-year plans.

It was time to pause, drawing on experience to produce a new vision of Oman's economic future. 'Vision Oman 2020' outlines proposals for the Sultanate's development over the 25 years to 2020. It responds to the far-reaching changes in the world economy and the revolution in telecommunications and information technology that has transformed the global system of production and exchange.

4.2.1 Industry sector

The Sultanate's policies have consistently given attention to creating appropriate conditions for investment, providing infrastructure and developing the national manpower to aid the country's economic growth. These achievements create the impetus for diversifying sources of income and focusing on the productive sectors which include gas-based industries, information technology (IT), mining and tourism (Ministry of National Economy - Oman, 2006). Investment in tourism and support for the Omani export sector will result in a reduced dependence on oil as the main source of income. The Sultanate has attempted to establish its economic position in the region and internationally by adopting a realistic philosophy.

4.2.2 Tourism sector

An area of high priority is the comprehensive development of the tourism sector. Two studies have been carried out on the long-term development of this sector in order to make Oman a competitive tourist destination. In an effort to promote the tourism industry, a Ministry of Tourism was created in 2004 to take responsibility for the tourism sector in Oman.

4.2.3 Agriculture and fisheries sector

The agriculture and fisheries sector is of major economic and social importance owing to the direct impact it has on food security and the large numbers of people it employs. The country's social and economic progress is reflected in the growing importance of agriculture and fisheries and the efforts that are being made to increase their contribution to the GDP (Ministry of National Economy - Oman, 2006).

Today agricultural production accounts for 26.5 per cent of the country's total non-oil exports. Agriculture and fisheries production provides around 53.8 per cent of the Sultanate's food requirements. The country is self-sufficient in fish, dates and bananas, as well as in vegetables and fruit when they are in season. Around 141,000 people work in the agricultural sector and the government provides farmers with a range of services (Ministry of National Economy - Oman, 2006).

4.3 Social development

Since 1970 the Sultanate has made great strides in developing its services, leading to striking improvements in the country's public hospitals. The government today provides 87 per cent of the country's hospitals and hospital beds, as well as 90 per cent of outpatient services and 90 per cent of inpatient services (Ministry of National Economy - Oman, 2005a).

Before 1970 there were fewer than 100 people employed in the health sector and only 13 doctors. By the end of 2003 there were 17,740 people including 2,497 doctors and 7,057 nurses working in government institutions. Some 58 per cent of the total personnel were Omanis. At present the government operates 48 hospitals, of which 13 are referral hospitals (Ministry of National Economy - Oman, 2005b).

4.3.1 Education sector development

There are currently 1,022 schools in Oman, including three special schools, with a total of nearly 600,000 male and female pupils (Ministry of National Economy - Oman, 2006). In the academic year 2003-2004, a modernised Omani curriculum for the kindergarten stage was introduced in all private schools and several other educational projects have already been implemented. Nearly 300 schools are teaching the two stages of the Basic System, which aims to develop the pupils' abilities. Independent and analytical thinking is encouraged and curricula focus on the individual student's needs (Ministry of National Economy - Oman, 2005a).

The government encourages the private sector to invest in education. Since 1977, 132 private schools have been opened (Ministry of National Economy - Oman, 2004). These follow three distinct programs: the pre-school and kindergarten programs which follow an Omani syllabus; the bilingual program in which selected subjects are taught in English; and the English Language syllabi in which schools can introduce their own programs.

In the 1970s and early 1980s higher studies were available only through overseas scholarships, which were thus crucial in producing trained and qualified Omani personnel. However, in 1994 the government addressed the crucial need to expand the number and scope of higher-learning institutions, both government and private, to meet the needs of the labour market.

Higher-education institutions began to appear in the Sultanate in the early 1980s with the establishment of the Omani Institute of Bankers (currently the Institute of Banking and Financial Studies) in 1983 and the Intermediate Teachers' Colleges. The Technical Industrial College was opened in the same year to provide specialist vocational qualifications. Institutes were also established to train Omani nurses, radiographers, physiotherapists and dental hygienists to work in the government hospitals. The private sector became involved in higher education during the second half of the 1990s and there are at present fourteen private colleges and three universities in Oman.

4.4 Telecommunication and infrastructure development

Oman Telecommunication Company (Omantel) is a closed, Omani Government-owned, joint-stock company and is the principal provider of telecommunication

services in Oman (Information Technology Authority - Oman, 2007). The company aims to create a strong telecommunications infrastructure to support the country's economic development and is training and employing high-calibre nationals (Al-Wohaibi, 2006).

Omantel's telecommunications network covers 95 per cent of the entire Sultanate's population, reaching 98 per cent of the inhabited areas with its telephone services as at the end of April 2005. The company has a customer base of over 900,000 subscribers (Information Technology Authority - Oman, 2007). It is the only provider of Internet services and manages domain name administration through Oman Network Information Centre (OMNIC). ADSL and ATM broadband solutions are available to facilitate the use of Internet by schools, universities and other users.

It offers a full range of facilities such as fixed telephone, fax, mobile/GSM and other high-technology services, and is currently expanding its transmission network in the regions. Omantel also provides an 800 number Toll Free service beginning in 2005 to promote a more active relationship between local establishments and customers. By June 2007, Omantel had nearly a million subscribers for mobile services, more than 257,235 fixed line subscribers and 65,611 Internet services subscribers (Information Technology Authority - Oman, 2007). Several intensification stations have been launched in rural villages in order to provide maximum coverage.

Oman's key infrastructure provider, Omantel, along with Oman Mobile, retain their prime market position with cutting-edge services such as Short Message Service, GPRS (General Packet Radio Service), MMS (Multimedia Messaging System), ISDN (Integrated Services Digital Network), MaxNet (ATM broadband) and PowerNet (ADSL broadband), WAP (Wireless Application Protocol), Taif (email forwarding to mobile) and a range of other services (Oman Telecommunication Company, 2005; (Ministry of National Economy - Oman, 2005a).

Asymmetric Digital Subscriber Line (ADSL) has created a higher bandwidth highway for Internet connection that is always available to anyone working on a PC. This technology gives speedier data downloads while allowing people to use the telephone or fax line at the same time as surfing the Internet. With an ADSL modem this speed can be achieved with existing telephone cabling systems. As an incremental technology this service will enable businesses to offer video-on-demand about their products and services, or universities to broadcast lectures, and even deliver on-

demand entertainment or health services. Table 2 below shows the status of telephone and Internet connectivity in Oman.

Table 2: Oman Connectivity

Type	Per cent Change (06/07)	June 2007 No.	2006 No.
Fixed Lines	-5.6	218,406	231395
Prepaid Card Fixed Telephone – Sahl	-3.1	38,829	40,061
Cellular Mobile Phone	8.5	267,020	224,117
Prepaid Card mobile – Hayyak	18.9	1,868,519	1,571,907
Internet Subscribers (Dial-up)	-0.6	48,415	48,684
Broadband Internet (ADSL)	13.5	15,795	13,917
Other broadband (Leased Line)	15.4	284	286
Other Internet	12.1	1,117	996
Public Telephone - pay phone	0.4	6,855	6830
Paging	-8.8	5,632	7,166
Telex	-1.9	152	155
Voice Mail	-5.5	480	508
Leased Circuits	1.2	3,276	3,236

Source: Ministry of National Economy, Monthly Statistical Bulletin July 2007

Nawras Company

This new entrant in the marketplace has captured over 100,000 customers within a short span of four months. Its service covers the Sultanate with an agreement to share Omantel's network wherever it lacks its own stations. Its portal enables charges verification, online statements and payment through approved partners.

Telecommunication Regulations Authority

Telecommunication Regulations Authority (TRA) is a government body, established under the Telecommunications Regulatory Act under Royal Decree No. 30/2002, to regulate and liberalise competition in the telecommunication sector. It has been identified that ICT access must be affordable for all and hence Oman has liberalised its telecommunication sector since March 2005, to be closely monitored and

controlled by the TRA. Its e-services are ideal examples of how point-solutions can immediately benefit citizens while converging into a broader e-government vision.

4.5 Oman digital society

The government of Oman is committed to developing a digital society and providing e-government services. In fact, it considers development of a digital society as an important aspect of the socio-economic development of the country. Several key initiatives have been taken up towards achievement of this objective, including the setting up of a Ministerial IT Committee, supported by a high-level task force, with representation from senior management in various departments (National Committee for Information Technology, 2003).

The government commissioned a leading international IT consultancy firm to develop a strategy for e-governance and this was further extended to cover a strategy for the development of a digital society. As part of that study, a detailed readiness survey of all government entities was also carried out (National Committee for Information Technology, 2003).

The digital society strategy of Oman goes further than the e-government initiative to reflect the society as a whole in the adoption and integration of digital technology at home, work, in education and recreation (Bhantnagar, 2006). It is a novel model based on a multi-year, community-based and integrated strategy that will provide a firm foundation and infrastructure to sustain the developing technologies. With ICT technology as a powerful enabler for creating a knowledge-based economy as envisaged by the Vision 2020 economy plan (National Committee for Information Technology, 2003), the unified methodology comprises the primary areas of infrastructure development, regulatory framework, education and learning, and economic development.

The Information Technology Authority (ITA) and its e-governance initiatives are conscious of the issue of technology exclusion and have ensured that there is bridging within the digital divide by involving the entire community as partners in its mission toward digital e-Oman (Bhantnagar, 2006). It has been identified that promoting the spread of phones and PCs is an important means of achieving this goal. Therefore, e-government in Oman is all about combining the various facets of its

services around the citizens' needs and transforming the organisation of government culturally, technically and educationally (Al-Ruzaiqi, 2006).

The digital vision for Oman is that:

> The leveraging of information technology and communications in providing collaborative services to public and private sectors and citizens through electronic means has been the driving force to move forward the Sultanate to the knowledge-based economy and achieve sustainable development.

The digital society project is a vital one for Oman, offering exciting opportunities to the public and business communities. It is essential that it succeeds and that success will come only with the support of the whole community.

4.5.1 Oman e-government project

The push for e-government progress is seen as a natural extension of the country's comprehensive national strategy for IT development – which includes building the necessary information systems, updating the legal system to deal with the challenges of disruptive technologies and securing government-to-citizen communications in the digital era. Building on its achievements over three decades, Oman has ambitious plans to capitalise on the enormous opportunities opening up (Yigitcanlar, 2003).

Most countries are now trying to implement drastic reforms to the ways their governments function. The first stage of reform began in the 1980s and took place largely in the context of a transition to free-market economies. The second phase of the reform process, which began in the 1990s, was triggered by information and communication technology (ICT). E-government is an essential element of such a society but is nonetheless only one element. Equally, e-government in itself is of little value if citizens and businesses do not have the knowledge, incentives or resources to benefit from e-services (Al-Ruzaiqi, 2006).

It is indisputable that more work needs to be done on the foundations of e-government in the Sultanate (Al-Ghassani, 2006). In addition to the need to raise fiscal investment, Oman needs highly qualified and trained manpower. The uptake of e-government in Oman will also depend heavily on the degree of trust that citizens and businesses have in electronic transactions (Al-Ghassani, 2006). This in turn will

depend on factors such as privacy, security and the enforcement of 'electronic' contracts. Appropriate 'e-legislation' is essential to meet these requirements.

Oman, in light of its achievements over three decades, proposed ambitious plans to benefit from the huge opportunities available for IT and the study of the national strategy was seen to be the first step in utilising these opportunities if the detailed recommendations and working plans in the study were to be implemented. E-government was considered a basic element of a digital society and it would be useless if citizens were unable to benefit from its services (National Committee for Information Technology, 2003).

The digital vision set for Oman called for the use of information and communication technology in services provision, making data available for public and private sectors and the adoption of computerisation as the main means of rendering services. The most important recommendation in the study (Gartner, 2003) was that the government should seek to implement the strategy as soon as possible. Other recommendations included upgrading the existing information technology system; encouraging a shift from cash to electronic payments; installing a government e-payment portal to be set up and initially operated by a private management; and the use of personal identity 'smart' cards linked to the new civil register for payment purposes.

Developments in information and communication technology created a digital divide in the world and Oman faced a critical challenge in its history. Steps to be taken in coming years would determine Oman's position among other countries and the opportunities that would be available for its citizens in this regard. Oman was well placed to gain much by establishing and activating the proposed structures for strategy implementation and defining the role of Oman Telecommunication Company (Omantel) in extending fast communication services to remote areas.

Transforming government into e-government

Oman's e-government initiative has the vision of transforming Oman into an advanced, world-class e-government by a seamless integration of all ministries and government entities to provide faster and more effective public services online. By facilitating better interaction between citizens, businesses and government, e-Oman will take Oman forward to a new age of progress and prosperity. Additionally, e-Oman seeks to empower people and transform Oman for the better.

Transforming businesses into e-businesses

Oman's e-government initiative will build a knowledge-based economy in Oman by developing world-class e-government services that will facilitate more streamlined interaction between government, citizens and the corporate sector. In addition, e-Oman's business-centric initiatives will ensure that valuable time and money can be saved. Ultimately, e-Oman will offer more convenient, cost-effective and citizen-oriented corporate services that will change the way of doing business in Oman.

Transforming people into e-citizens

Oman's e-government initiative is committed to creating a knowledge society in Oman by helping all people to become enabled in information communication technologies (ICT) and providing them with e-government services that will make their lives better and more convenient (National Committee for Information Technology, 2003). With a wide variety of citizen-centric initiatives connecting the society with the government, e-Oman will provide more efficient and productive public services. In general, e-Oman will offer advantages and benefits that will change life in positive ways.

Pre-existing IT systems

Oman has a centralised IT system for payments and accounting, as well as basic personnel functions such as payroll. That is supported by a robust computing infrastructure and dedicated telecom links in all government offices throughout the country (Srinivasan, 2005). All payments and receipts are made and accounted centrally, as is management of the payroll for the entire government.

This application is a legacy application on an IBM mainframe system with a DB/2 database, which has been running efficiently for the last two decades. Transaction processing is very effective, despite MIS functionality being somewhat limited. While there are other IT systems in individual government departments, almost all of them are confined by organisational boundaries. The other significant features include:

- Networking and computing infrastructure in government departments is widespread and does not represent a bottleneck for e-government initiatives
- Government departments have computerised almost all their administrative functions and, in many cases, their core business and support functions also

- Almost all departments have a presence on the Web, providing varying degrees of information
- Web-based querying facilities have been provided to the public on certain key systems
- In a few cases such as electricity and water billing, the third-party billing agent has link-ups with commercial banks for Internet-based payments.

However, there is no IT law in place in Oman and paper documents are necessary for validation and to support applications for government services. Substantial government-citizen interfaces will soon be Web-based, thereby making the services available online and in a citizen-oriented manner based on a life-path-services and life-event-services model. For citizens to derive its benefits, they need to be prepared and ready. Information technology (IT) literacy among the masses is an essential direction addressed by the Digital Oman strategy. Again the various public and private-sector organisations, with directions from the ITA, have set up innovative and pragmatic IT literacy measures (Al-Ruzaiqi, 2006).

It is acknowledged that e-government strategies, and the policies and regulatory activities required to develop and govern a digital society, are often developed as loosely connected or even separate activities. Recognising this risk, the Oman digital society strategy takes a highly integrated approach, with carefully structured lines of responsibility and accountability and a special office to support integration. Below are some of the opportunities that the digital society project offers Oman (Gartner Group Consultancy, 2003):

- Streamlining Government services to citizens and business, better, faster service and reduced bureaucracy. A good example is the Company Registration One-Stop Shop, where the process of registering a new company takes less time as a result of 'e-enabling' the service.
- Supporting the growth of knowledge-based industries and developing a local ICT sector. Knowledge Oasis Muscat is an important component of the Digital Society project, home to over 30 companies and two leading ICT colleges.
- Supporting a more competitive environment, which will result in better service and reduced costs to customers. Already competition has been introduced in the mobile telephone sector.

- Providing employment for Omani youth. A very high proportion of Oman's population is under the age of 15; knowledge-based employment offers the best prospects for growth while providing relatively well-paid jobs. The Digital Society project will make Oman a more attractive destination for foreign investment and its educational sub-projects will dovetail with the requirements of ICT entrepreneurs. An exciting new initiative is under way with the International Computer Driving Licence (ICDL) and new courses are planned at Sultan Qaboos University.
- Providing new and greatly improved health, education and entertainment facilities to all regions of Oman.
- Higher levels of security, as exemplified by the Royal Oman Police (ROP) 'smart' card and national registry system.

4.5.2 Public-sector e-government initiatives

The Information Technology Authority (ITA) has taken the many steps to coordinate the strategy for implementation of e-government project in Oman (Bhantnagar, 2006, Al-Ruzaiqi, 2006). The current ITA digital initiatives includes the implementation of e-services portal, government network, e-legislation, e-payment gateway, e-tendering, One-Stop Shop initiative, national registration system, security policy framework, IT literacy for civil service employees, and socio-economic database system.

4.5.3 E-services portal

Ubar portal, the gateway to Oman's digital society, is designated as the main gateway to electronic services offered by the government. This modern Web portal is designed to provide a rich, personalised, unified and highly customisable experience to its users. Access to the portal can be gained any time, anywhere through multiple channels such as the Web and mobile devices. Navigation on the portal site will be simplified through a life-event-service delivery model and searchable content.

For any portal visitor, a click of a button triggers a number of automated, sequenced and synchronised service delivery steps in a seamless and transparent manner. The visitor's authenticated identity will be transmitted to various systems involved in the service delivery and set up the proper authorisations required to complete the service delivery process. The use of electronic forms and digital

signatures will eliminate visits to government counters to submit signed paper applications. Payment for online services will occur electronically on the portal and will provide the service requester with a choice of payment instruments.

4.5.4 Government network

The government network is a nation-wide telecommunication infrastructure interconnecting government agencies (Information Technology Authority - Oman, 2006a). It aims to support other e-government initiatives and ultimately to improve public service. It is planned to link all ministries and government entities, enhancing the delivery of a range of e-services provided by them. This network service will have the capability of supporting data, voice and video over the same infrastructure and will ensure service delivery according to predefined service level agreements (SLAs) (Information Technology Authority - Oman, 2006a). In fact, this network has been designed to cater for the potential and justified demand for convergence and advances in the technologies of a digital society.

The implementation and management of the government network has been outsourced to the Oman Telecommunication Company (Omantel), who has been investing heavily in the expansion of an MPLS-enabled, IP network. MPLS (Multi-Protocol Label Switching) can also be used to provide Virtual Private Networks (VPNs), which can isolate the traffic of different ministries across the government network. MPLS-based VPNs are also very flexible, as the reconfiguration or addition of new sites to a particular Ministry VPN can be achieved with relatively minimal effort. The use of MPLS will also allow the use of traffic engineering to balance the traffic load on the various links within the network, thus making it possible to utilise the network bandwidth more efficiently.

4.5.5 E-legislation

Oman's digital society initiatives require substantial legal protection for the various entities involved in the use of ICT for official and personal communications and transactions. To increase the level of trust held by citizens and businesses in electronic transactions, ITA has initiated the formulation of e-legislation for Oman. The amendments and enhancements to Oman's existing body of legislation and their implementation will be phased in gradually. The project has been awarded to a

professional law firm to produce draft legislation for review by ITA and other legal authorities and for subsequent formulation.

The Digital Legislation will address key issues such as: e-law, intellectual property, taxation and data protection, legal recognition for electronic signatures, admissibility and evidential value of data messages, electronic payment validity, jurisdictional matters, time and place of dispatch of data messages, retention of data messages, enforcement of 'electronic' contracts, acknowledgement of receipt of messages and protection for privacy and security.

In addition, the regulation of personal data handling such as the collection, processing and transfer of personal data within or between community institutions, will also be addressed in a comprehensive manner by Oman's proposed e-legislation.

4.5.6 E-payment gateway

The National Electronic Funds Transfer (EFT) strategy creates a framework for a modern, national payment infrastructure in the Sultanate (Information Technology Authority - Oman, 2007). ITA is currently working with the Central Bank of Oman (CBO), the chief banking and financial regulatory authority of Oman, on the natural evolution of this framework – specifically on the e-payments and e-payment gateway aspects. The overall strategy is to encourage the move away from cash as the major payment mechanism within Oman, by providing alternative, improved, secure and efficient electronic payment mechanisms for citizens, businesses and government entities.

The EFT strategy of the CBO encompasses the phased implementation of a comprehensive set of modules such as Real-Time Gross Settlement (RTGS), Automated Clearing House (ACH), a new ATM & POS switch, together with other enhancements to the existing banking infrastructure. The CBO has recently – and very successfully – completed the implementation of an advanced RTGS, which is today enabling reliable and secure electronic transfer of high-value funds between the member banks (Information Technology Authority - Oman, 2007).

The e-payment gateway project is being undertaken by ITA in liaison with CBO, the Ministry of Finance, local banks and international payment service providers. This e-payment gateway will enable secure online payments accessible through the government's Ubar portal for government e-services in an integrated

manner. It will support the use of multiple payment instruments utilising the Ubar portal access channels such as the Internet or mobile devices. The gateway will authenticate users utilising globally accepted authentication standards; it will affect services following the formal authorisation of transaction requests by the relevant bank within this overall e-payment framework.

4.5.7 E-tendering

As part of the e-Oman initiative, ITA and the Government Tender Board (GTB) are working closely to automate all government tendering and procurement processes that will be integrated with the Ubar portal as one of the 'quick win' projects (Information Technology Authority - Oman, 2007). Quick wins are those flagship projects aimed to get the digital society 'off to a flying start'. Once these are implemented, the public will start to feel the effects of having a digital society and an e-government and will realise the benefits of interacting with the government electronically. Typically these quick wins have a wide impact on the public and are relatively easy to implement within a short period of time. They are preferably contained within one service-providing entity and possess a high degree of readiness without requiring massive process restructuring.

The primary objective is to establish a centralised, state-of-the-art procurement management system and processes. This will help to achieve greater efficiency and will also enhance the elements of transparency and accuracy in government procurement processes, at the same time providing considerable cost reduction. ITA contributes to this activity by providing skilled, experienced professionals in the area of applications development and implementation. These professionals have helped GTB to define the required specifications for e-services that fit with GTB's e-procurement vision.

The ITA office provides necessary support to GTB in the selection of solutions based on best-of-breed technologies and world-class vendors, thus ensuring best practices are followed while implementing the solution. ITA is also involved with GTB in defining the appropriate interfaces to integrate with other government applications over the Government Nervous System, to ensure seamless service availability on the Ubar portal.

4.5.8 One-Stop shop initiative

The One-Stop Shop (OSS) is a highly useful service offered by the Ministry of Commerce and Industry (MoCI), which will enable investors to set up companies in Oman while minimising paperwork, saving costs and time. ITA has worked with MOCI to align this service with the overall e-government framework in an integrated manner from a single-access point. The commercial registration database is a shared database within the e-government architecture whereby other entities can reference complete and updated company data electronically via the Government Nervous System (Ali, 2006). The commercial registration number becomes a national identifier for businesses.

All applications and governmental processes involved in company registration and approval requests will be possible online through the Ubar portal. The Ubar portal will become a single-entry access point for OSS services for appropriate entities. The OSS will improve services rendered to new and existing businesses by minimising the number of visits needed to complete registration processes. In future the payment for such services will also be performed online through other electronic channels.

4.5.9 National Registration System

The National Registration System (NRS) was developed by the Directorate-General of Civil Status at the Royal Oman Police (ROP). NRS is an integrated computer system with archives of accurate information about social events for all citizens and residents of Oman. The system generates a unique civil number for each individual at the time of registration. This civil number is printed on ID cards and used to verify an individual's identity while they are accessing e-government services (Directorate General of Civil Status - Oman, 2006). The project covers many services both for Omani people as well as expatriates including the issue of Omani identity cards (ID Smart Cards), issue of resident cards for expatriates, registration and issue of certificates for births and deaths and registration of marriages and divorces.

ITA is involved with the DGCS in the evaluation of applications and solution-providers for the NRS system. It has also contributed its expertise to the quality assurance of the entire project. ITA implements the Digital Oman strategy by ensuring the delivery of this service as a shared means of authentication for electronic transactions through the Ubar portal (gateway to e-government services).

4.5.10 Security policy framework

The security policy framework has been derived from a structured collection of independent guidelines, processes and practices. The framework aims to ensure the protection of information assets from unauthorised access to or modification of information, whether in storage, being processed or in transit. It also aims to protect against the denial of service to authorised users, or the provision of service to unauthorised users, including those measures necessary to detect, document, and counter such threats.

The framework is based on existing, accepted standards, guidelines and practices and reflects the behaviours of an initial community of high-performing organisations. Both business and government organisations can implement the framework with practices they target, or are required to use in their market sector and country.

4.5.11 Civil service employees IT literacy

This project is undertaken by ITA to evaluate international standard certification programs for IT literacy building within the government sector (Staff editor, 2005, Information Technology Authority - Oman, 2006b). It undertakes to train all government employees through well-structured programs and in liaison with the Ministry of Civil Services. The major benefit from this initiative is that government employees will be equipped with the skills and capabilities to provide electronic services through new channels. This initiative also aims to increase awareness about harnessing information communication technologies to provide better services to the community.

4.5.12 Socio-economic database system

The socio-economic database system (SED) disseminates statistical data that are available from as far back as 1970 to the public through electronic means, especially the Internet. The back-end is driven by a database that enables bilingual English and Arabic Web searches on the basis of various socio-economic indicators. This is expected to increase transparency in the planning process for the entire nation and promote the quality of research into various economic aspects based on authentic data.

In addition to the above-mentioned steps in its journey to create a digital society, Oman has seen the introduction of several digital initiatives by some public-sector organisations that enable e-governance services between ministries and other government bodies (G2G), between government and citizens (G2C) and between government and businesses (G2B) (National Committee for Information Technology, 2003; Ministry of National Economy, 2004). There are many digital initiatives by the some public-sector organisations like Muscat Municipality e-services, Royal Oman Police initiative, Labour card smart forms, SANAD e-services centres, the e-learning initiative and the e-tourism portal.

4.5.13 Muscat municipality e-services project

Muscat Municipality as an institution dedicated to the improvement of public services has made positive contributions in the application of information and communication technology in e-government. Muscat Municipality succeeded in the area of e-government provision within a short span of time. The achievements have been widely acclaimed by the people of Oman and institutions from all over the world. It was in 1985 when Muscat Municipality decided to invest in computerisation and bought its first computers from Wang.

Muscat Municipality has connected all of its PCs in one large network (Microsoft Corporation, 2004). All users have to log in to be able to use the PCs. This was established using MS Active Directory. Currently there are about 600 PCs in the network. E-mail was introduced later to enable Muscat Municipality's employees to communicate with each other. An exchange server was hosted in the Muscat Municipality premises. Every employee with a PC is entitled to have his/her own e-mail address. Considering that Muscat Municipality consists of a large headquarters building and eight Directorates-General employing nearly 4,500 people separated by physical distance that can reach up to 50 km or more, the e-mail system today is heavily used by the employees to communicate and share documents. Local e-mail is a formally accepted means of communication within Muscat Municipality (Directorate General of Muscat Municipality, 2003).

Muscat Municipality stores all of its data in one unified database (Oracle 9i). As a result, access to data become easier especially for developers. Data can be presented using a client/server approach or even accessed through the Web. The

Municipality has a clearly defined goal in terms of both internal and external services. Internal services are fully computerised in order to assist employees to devote their time and resources fully for the public service. The external services are also fully computerised to enable citizens to reap maximum benefit without having to waste their time and energy on bureaucratic hurdles. All insurmountable hurdles have been removed so that, with the application of information and communication technology in e-government, people find interacting with Muscat Municipality a simple and efficient task (Directorate General of Muscat Municipality, 2003).

The goal was set to ensure that all residents of Muscat (numbering more than half a million) – regardless of their level of education – should be able to use the electronic services of Muscat Municipality from anywhere and at any time by having technologies that suit them (Al-Balushi, 2003). The Muscat Municipality goals are to improve the relationship with the citizens, to provide round-the-clock services, cut departmental hierarchies, to reduce queuing in Muscat Municipality offices, and single-point contact to speed up services. In order to improve services to the people, a need for internal development was first conceived and addressed. Muscat Municipality's IT team did all the updates and enhancement to the Human Resource Management system. It improved the speed of hiring, payroll and the communication between various departments and directorates scattered throughout the districts of Muscat (Al-Balushi, 2003).

Any technological development undertaken without first identifying strategies is doomed to fail. Financial resources alone do not guarantee success in the IT sector. On that regard, Muscat Municipality has laid out different strategies to sustain its e-services initiative by creating mechanisms to provide information outside of municipality premises and working hours, providing e-services using various types of technology, public should be able to pay electronically (e-payment), create awareness programs for municipality employees and the general public, creating new rules and regulations to suit and support e-services and motivate the public to use e-services.

E-services initiatives

The many online services provided by Muscat Municipality include:

Purchasing

The purchasing system was developed in-house and serves all Muscat Municipality departments and directorates. It has been recently integrated with an exchange provider that links the purchasing system with corporations and companies. This exchange provides Muscat Municipality with a communication format to exchange purchasing orders and quotations. Currently Muscat Municipality is linked with more than 100 companies (Directorate General of Muscat Municipality, 2003).

After the integration with the exchange, the departments started issuing the purchase requests electronically. Quotation requests are now passed to many companies through this exchange and quotations can also be submitted through the exchange. There are plans to integrate the purchasing system and the exchange with a payment system.

Tender services

Tender bidding is a normal procedure in the government sector for awarding contracts to companies and within Muscat Municipality the entire system is computerised. It covers all aspects of the tender process from writing specifications, issuing the tender to finalisation and award of the tender. It is similar to the normal procedure but Muscat Municipality provides bidders with more facilities to prepare their tenders in better ways. Muscat Municipality publishes the tender details on its Website for that tender. All the participants can view the site, lodge their tender queries and see the answers.

The application of information and communication technology has made tendering one of the best procedures of Muscat Municipality and the Municipality awards millions of dollars' worth contracts for development of infrastructure facilities every year including for roads, bridges, streetlights, landscaped gardens and parks.

Rent contracts

The rent contract is one of Muscat Municipality's main sources of income. It is mandatory for all rent contracts to be registered with Muscat Municipality upon payment of a 3 per cent tax, which goes up to 9 per cent if the tax is not paid within 30 days of the tenancy agreement expiring. In the past each directorate was working individually, using a Local Area Network (LAN) under a DOS operating system.

The application is now available online where the rent contract summary of Muscat Municipality can be obtained by an online query. The application also allows users to renew contracts and download forms. As an instant service to landlords, Muscat Municipality sends SMS notifications before the expiry of every rental contract.

Building permits

Muscat Municipality has clearly defined building regulations. No construction can be carried out in Muscat without the drawings being approved for architectural plans, structural details and setbacks as defined in the land deeds. Having submitted the drawings to the Building Department, in the past consultants had to attend the department in person to follow up on the status of their applications. However, they can now monitor each application on the Municipality's website. This saves considerable time for the consultants to devote to their normal business activities. By virtue of a computer-generated application number, even the owner of the building can now monitor the progress of his application. It is indeed a great achievement considering the fact that on average the Municipality processes nearly 2,000 building permits every year.

Municipal licenses

Every business establishment in Muscat must be registered with the Muscat Municipality. The Municipality provides various licenses and interacts with the citizens for various purposes. To be able to issue municipal licenses, which are renewed periodically, one first has to be registered as a company with the Ministry of Commerce and Industries and the customer must have a Commercial Registration (CR) number to register their license and rent contract. The license fees depend upon the kind of activities, nature of business, number of branches and locations.

An average of 500 to 800 licenses per day is issued by Muscat Municipality. Previously licenses were operated individually for various purposes, including Commercial Licence, Vehicle Licence, Display Boards and Health Licence.

Mobile Rial (mRial)

When Muscat Municipality decided a few years ago to establish a presence on the Internet, a website was set up to provide information about the Municipality. Originally most of the pages were static but with the passing of time the need was felt

to offer more services to the public. Several dynamic pages were designed to offer dynamic data and provide read-only access to some information held in the Muscat Municipality database. These services facilitated public access to Muscat Municipality's database through the website and allowed people to view the status of their application for building permits, expiry dates of their rent contracts, due dates for renewal of municipal licenses, and parking violations recorded against vehicle registration numbers.

The mRial application enables residents of Muscat to open prepaid online accounts from which to pay for various government services they may need from time to time. A subscriber to the service pays to top up his account at any of the authorised bureaus all over Muscat. This amount is instantly credited to the subscriber's prepaid mRial account, which is debited for a fixed fee every time the subscriber makes an online mRial payment for, say, his rent contract or a parking violation.

Under the new mRial system, the user is required to enter his ID number upon registration. Using this ID number the system searches for related municipal licenses, rent contracts, parking violations or building permits.

Royal Oman Police initiative

With the recent growth in e-government services, the Royal Oman Police (ROP) and the mobile phone operator Nawras have joined forces to develop a digital link between the two entities that enables Nawras to activate lines over the phone by using the customer's civil ID number to verify personal information (Directorate General of Civil Status - Oman, 2006).

This e-initiative is seen as an important step in helping to shape e-government practices in Oman, one that has redefined traditional business conduct for both the ROP and the Sultanate's telecommunication industry. Through Nawras, photocopying of ID cards becomes a thing of the past; instead, relevant personal information is checked instantly through the ROP's civil ID database, making it easier to multiply sale channels to 450 outlets across the Sultanate with minimum logistical and overhead requirements (Directorate General of Civil Status - Oman, 2006).

Labour card smart forms

The Ministry of Manpower has implemented 'smart forms', an electronic system for issuing labour cards to expatriates. The license to use the system is given only to

centres run by Omanis and SANAD e-services centres. This system saves time and effort by speeding up the issue of labour cards. The new smart form will help to overcome errors as the data will be printed electronically. Large companies can complete the forms at their offices after obtaining Ministry approval and installing the required software.

SANAD e-services centres

The SANAD program aims to create gainful employment and business opportunities for young Omani entrepreneurs through IT-enabled services (ITES). The SANAD e-services centres are owned and operated by trained and qualified youth entrepreneurs, as a citizen-to-citizen national initiative. They are responsible for the use of the Ministry of Manpower's labour card smart forms, an electronic system that speeds up the process of issuing labour cards for the expatriate workforce in Oman.

E-learning initiative

The Ministry of Education (MOE) has partnered with CISCO Wireless Solutions to provide more than 200 schools and 100,000 students in Oman with wireless, high-speed access to the Internet and e-learning applications (Staff editor, 2005). It has upgraded its ICT infrastructure to improve connectivity within the regional centres and now has the capability to offer e-learning facilities. It has incorporated the International Computer Driving Licence (ICDL) certification, the internationally recognised computer proficiency standard for schoolteachers and students.

Tourism portal

The Ministry of Tourism's Welcome Oman portal provides information on Oman to potential tourists all over the world. The portal presently provides information on visas, hotels, restaurants, car rentals, travel and tour operators, shopping, cities, natural attractions, heritage sites and so on. The portal's capabilities are presently being upscaled to provide online services such as hotel reservations and travel enquiries.

4.5.14 Private sector initiatives

The private sector in Oman has also played an important role in creating a digital society in the country through a range of digital initiatives that offer better services to

various stakeholders and result in improved organisational performance. The following are the key initiatives currently operated by the private sector in Oman:

- online banking
- e-procurement solution
- PASI portal.

4.5.5 Online banking

Bank Muscat, one of the major commercial banks in Oman, has pioneered online banking in Oman with secure, industry-standard technological solutions. Any online-banking customer with Internet access can perform most routine banking transactions through these websites. It is now possible for customers to check account balances, make credit card payments, transfer funds between their own personal or business accounts with the same bank, pay utility bills and even school fees. Bank Muscat's e-trade enables online business banking.

Oman Arab Bank has a smart card-based, full-fledged electronic payment system that can handle small and large payments such as fees to government departments and private outlets like Omantel (for bill payments). It has also signed up with the Muscat Municipality for the payment of fees and parking fines. OAB Smart Card is the first step towards a full-fledged e-payment gateway in the Sultanate of Oman. It will enable both the government and private sectors to implement e-commerce applications such as G2C, B2B and B2C through the use of highly secured offline transactions and, at a later stage, online transactions via the Internet.

E-procurement solution

Petroleum Development Oman (PDO) has an e-procurement system in place for connecting all its vendors through an Internet-based system. The system was implemented through a local digital exchange for document transfers with SAP back-end systems based at the PDO. This solution has resulted in a reduction of processing time as well as increased security and transparency within the procurement process. The automatic document tracking facility has reduced the time needed to trace documents from hours to seconds. The Intelligent Document Alert System also notifies vendors each time any new document is sent by PDO. The vendor receives a notification by SMS and e-mail, thus ensuring that each vendor is informed of any document exchange.

PASI portal

The Public Authority for Social Insurance (PASI) has launched its portal with the objective not merely of releasing legal articles, applications and procedures, but also of using the latest information and communication technologies to provide pensioners, employees, employers and other related social entities with the best possible e-services.

In the subsequent chapter, the data collected from the questionnaires and interviews is presented and analysed.

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5 DATA COLLECTION AND ANALYSIS

In this chapter, the data collected from questionnaires and interviews are presented and the survey data are reported and analysed statistically. The interviews conducted with key government officials are explained and analysed, and the results obtained are presented. The last section of this chapter is devoted to compiling the results obtained from the questionnaires and interviews. The return rate was actually 65%.

5.1 The questionnaires

5.1.1 Response rate

The data collection exercise was conducted during May and October of 2006. Approximately 520 questionnaires were distributed, of which 338 were returned, yielding a response rate of 65%. Of the 338 returned, 308 questionnaires (59%) were usable for further analysis. This response rate appears to be usual for traditional surveys methods. Approximately 30 questionnaires collected were either incomplete or blank. Questionnaires were discarded only if it appeared that the respondent either had failed to understand the questions by not answering any of the multiple-choice check questions correctly, or otherwise indicated that their responses would not be useful. Some others were discarded as they were incomplete. Other minor problems of this type were also encountered during the data collection process.

In order to encourage the subjects to deliver a high response rate, an official letter from the Ministry of Higher Education in Oman was obtained and attached to

the questionnaires (Appendix A). That approach gave respondents a positive impression and resulted in a good response rate being achieved.

5.1.2 Data coding

After the data were entered directly into an SPSS 11.0 spreadsheet, the descriptive statistics option in SPSS, along with manual checking, was used to examine the data for erroneous entries. Coding was intentionally kept as simple a process as possible. Specifically, Likert-type scale items were coded on a 1 to 5 basis with the following values: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. The missing values were filled later using the series mean for that particular item. Simple data screening (e.g. statistical/frequency distributions) was performed using SPSS version 11.0 for Windows.

5.1.3 Sample demographics

Data regarding the composition and characteristics of the sample (n=308) were collected for sex, age, education level, working experience, job position and employing organisation size. The sample population can be described as primarily male (87.3%, n=269) and in the 20-30 years age group (39.6%, n=122). More complete data regarding the sample population demographics can be found in Appendix D. The descriptive statistics of model variables are shown in Table 2

Over 70% of the respondents were between the ages of 20 and 40. There were 41 university students who represented about 13.3% of survey participants. The average age of the participants was in the 20-30 years group. Almost half of the respondents (49%) had a degree from a four-year college or graduate school, whereas 21% were high school graduates and 24.7% had a diploma degree. These results indicate that the respondents in this study were well-qualified to respond to the questionnaire distributed for this research.

The distribution for work experience among the respondents was: less than 2 years, 16.9%; 3-4 years, 10.7%; 5-6 years, 25%; 7-9 years, 24.4%; and over 10 years, 17.9 %. The majority of respondents reported having a Bachelor degree, with 38.6% holding graduate or professional degrees. Position levels ranged as follows: non-management type employees, 28.9%; senior management group including directors-

general, directors, section heads, engineers, IT staff, advisors, planners and analysts, 46.7%. Students and others represented 19.8%.

Analysis of the responses to the questionnaire gave a picture of the sample body as shown in the distribution of respondents by gender, age, education level, work experience, job type, working organisation and organisation size in Tables 3 – 9.

In the distributed survey, 90.6% of the responses were from men (n=279), 9.4% were from women (n=29), and 3.2% were missing data. The distribution of the respondents by gender is shown in Table 3.

Table 3: Distribution of Respondents by Gender

		Frequency	Percentage	Cumulative Percentage
Valid	Male	279	90.6	90.6
	Female	29	9.4	100.0
	Total	308	100.0	

Respondents' ages were well distributed, the largest percentages falling between ages 20-30 years (45.1%) and 30-40 years (31.5%). Table 4 shows the distribution of respondents by age range. In terms of age, the sample 285 ranged from 20s to 50-plus years, but one-third of respondents were over 40 years old (33.3%).

Table 4: Distribution of Respondents by Age

		Frequency	Percentage	Cumulative Percentage
Valid	< 20	23	7.5	7.5
	20 - 30	139	45.1	52.6
	30 - 40	97	31.5	84.1
	40 - 50	41	13.3	97.4
	50+	8	2.6	100.0
	Total	308	100.0	

For most respondents the highest level of education completed was a postgraduate degree, either Masters or Doctorate (10.7%). A very large percentage of respondents held a Bachelor degree (40.6%), while diploma holders represented 27.3% and high-school leavers represented the remaining 21.4%. The distribution of respondents according to education level attained is shown in Table 5.

Table 5: Distribution of Respondents by Education Level

		Frequency	Percentage	Cumulative Percentage
Valid	High School	66	21.4	21.4
	Diploma	84	27.3	48.7
	Bachelor	125	40.6	89.3
	Post-grad	33	10.7	100.0
	Total	308	100.0	

16.9% of the respondents had spent 1-2 years in their current jobs and 10.7% over 2 years but less than 4 years. In other words, about 64% of respondents had been in their jobs no more than 4 years. On average, the participants had held their current positions for about 4.4 years. About 50% of respondents had worked for over 5 but less than 9 years, 17.9% over 10 years, and 14.1% over 6 years but less than 10 years. The distribution by the years of work experience is shown in Table 6.

Table 6: Distribution of Respondents by Experience

		Frequency	Percentage	Cumulative Percentage
Valid	1- 2 years	55	17.9	17.9
	3 - 4 years	37	12.0	29.9
	5 - 6 years	82	26.6	56.5
	7- 9 years	80	26.0	82.5
	> 10 years	54	17.5	100.0
	Total	308	100.0	

17.5% of the respondents had over 10 years' working experience, 26.0% between 7 and 9 years' experience, and 26.6% between 5 and 6 years' experience.

The survey participants were drawn from the 14 government organisations and departments listed in the survey. Forty-one participants reported being university students and not working for a department other than those listed. About 13.3% of the responses were from Muscat Municipality, 13.3% from Sultan Qaboos University students, 8.8% from Oman Telecommunication Company, 8% from the Ministry of Civil Services, and 6.5% from the Ministry of Commerce and Industry. Muscat Municipality has the largest group of employees – over 4,400 at Muscat Governate – who were strongly encouraged to participate in the survey by the Municipality's manager. Table 7 shows the distribution of respondents by employer organisations.

Table 7: Distribution of Respondents by Working Organisation

		Frequency	Percentage	Cumulative Percentage
Valid	Royal Oman Police	19	6.2	6.2
	Ministry of Civil Services	27	8.8	14.9
	Ministry of Health	21	6.8	21.8
	Ministry of Higher Education	14	4.5	26.3
	Oman Telecommunication Company	27	8.8	35.1
	Muscat Municipality	41	13.3	48.4
	Chamber of Commerce & Industry	14	4.5	52.9
	Ministry National Economy	22	7.1	60.1
	Ministry of Municipalities & Water Resources	29	9.4	69.5
	Oman Centre for Investment Promotion	9	2.9	72.4
	Tender Board	8	2.6	75.0
	Ministry of Education	16	5.2	80.2
	Sultan Qaboos University	41	13.3	93.5
	Ministry Commerce & Industry	20	6.5	100.0
	Total	308	100.0	

The majority of respondents (68.5%) worked in administrative positions. There were 101 respondents (32.8%) who reported working as clerks and administrative (i.e. non-management) employees. In fact, this category of employee type might be thought to be over-represented. The distribution of respondents by their current job type and size of employer organisation are shown in Table 8 and Table 9.

Table 8: Distribution of Respondents by Jop Type

		Frequency	Percentage	Cumulative Percentage
Valid	DG	1	.3	.3
	Director	23	7.5	7.8
	Employee	101	32.8	40.6
	IT-Staff	39	12.7	53.2
	Section Head	37	12.0	65.3
	Advisor	2	.6	65.9
	Planner	7	2.3	68.2
	Analyst	6	1.9	70.1
	Engineer	20	6.5	76.6
	Other	31	10.1	86.7
	Student	41	13.3	100.0
	Total	308	100.0	

Table 9: Distribution of Respondents by Size

		Frequency	Percentage	Cumulative Percentage
Valid	< 100	21	6.8	6.8
	101 -200	15	4.9	11.7
	201 -300	22	7.1	18.8
	301 -400	28	9.1	27.9
	> 400	222	72.1	100.0
	Total	308	100.0	

5.1.4 Demographic relationships

Correlation tests were run to test the strength of the relationships between the demographic variables: age, gender, years of work experience and working position. The results of the correlation calculations are listed in Table 10.

Table 10: Demographic Correlation Results

		Education level	Age range	Position	Work experience	Organisation size	Sex
Education level	Pearson Correlation	1					
	Sig. (2-tailed)						
Age range	Pearson Correlation	.291	1				
	Sig. (2-tailed)	.000					
Position	Pearson Correlation	-.346	-.364	1			
	Sig. (2-tailed)	.000	.000				
Work experience	Pearson Correlation	.376	.556	-.410	1		
	Sig. (2-tailed)	.000	.000	.000	.		
Organisation size	Pearson Correlation	-.180	.034	.091	-.012	1	
	Sig. (2-tailed)	.002	.553	.111	.827		
Sex	Pearson Correlation	.026	.013	-.094	-.099	-.110	1
	Sig. (2-tailed)	.645	.821	.099	.083	.053	

** Correlation is significant at the 0.01 level (2-tailed).

Based on the correlation results shown in Table 10 above, there are strong positive correlations between education level, age and years of work experience, where Pearson Correlations are 0.291 and 0.376 respectively; the significant level is p < .001 and one-tailed. There is also a strong positive correlation between age and years of work experience, where Pearson Correlation is 0.556, as one might expect. However, there are negative correlations between education level and age range with position, where Pearson Correlations are -0.346 and -0.364 respectively. There is also a negative correlation between education level and employer organisation size, where Pearson Correlation is -0.180. Full correlation results are set out in Appendix E.

5.1.5 Reliability check

After the data obtained via the questionnaires were examined and entered into the SPSS software, the next step was to determine item reliability. Reliability is the consistency or repeatability of the measures (Kerlinger, 1986). Reliability refers to the property of a measurement instrument that causes it to give similar results for similar inputs (Nunnally, 1967). Cronbach's alpha is commonly used in the initial analysis to assess data reliability. In this study, all the research variables were operationalised with perceptual measures.

Cronbach's coefficient alpha was computed for each variable to test for reliability of the Likert-scale items (Table 11). As the Cronbach's alphas range from 0.6112 to 0.8893, the constructs are deemed to have adequate reliability for the next stage of validity analysis. In Nunnally's (1967) view, the minimum Cronbach's alpha of 0.6 is adequate for early research. Only two variables, complexity and IT champion, scored Cronbach's alpha of less than 0.60. Therefore, these two variables will not be included in the subsequent analysis.

Table 11: Reliability Analysis Results

Item	# of Items	Cronbach's Alpha
Relative advantage	15	0.8893
Costs	4	0.6112
Compatibility	5	0.8241
IT capability	8	0.7773
External influence	5	0.7088
Political and legal framework	2	0.6680
Management support	3	0.7308
E-govt development success	7	0.7015
IT champion	2	0.1540
Complexity	2	0.4511

5.1.6 Validity check

The Kaiser-Meyer-Olkin measure of sampling adequacy (MSA) was first computed to determine the suitability of using factor analysis. For this study, the MSA was found to be 0.760 as shown in Table 12. Thus, it was deemed appropriate to apply factor analysis. In total, sixteen factors with eigenvalues greater than 1.0 were identified. These factors explained 66% of the total variance as shown in Table 13.

Factor analysis was performed to confirm the construct validity of all variables. Construct validity was strongly supported by principal component analysis, in which all cross-loadings were lower than 0.40 for technological, organisational and environmental variables.

Table 12: KMO and Bartlett's Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.760
Bartlett's Test of Sphericity	Approx. Chi-Square	6012.538
	Df	1378
	Sig.	.000

Table 13: Total Variance Explained

Total Variance Explained							
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings (a)
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.797	12.824	12.824	6.797	12.824	12.824	5.473
2	4.847	9.146	21.970	4.847	9.146	21.970	3.741
3	2.738	5.166	27.136	2.738	5.166	27.136	4.368
4	2.610	4.924	32.060	2.610	4.924	32.060	3.556
5	2.299	4.338	36.398	2.299	4.338	36.398	3.200
6	2.196	4.143	40.541	2.196	4.143	40.541	2.935
7	1.977	3.731	44.272	1.977	3.731	44.272	3.129
8	1.807	3.409	47.681	1.807	3.409	47.681	2.540
9	1.648	3.110	50.791	1.648	3.110	50.791	1.988
10	1.369	2.584	53.375	1.369	2.584	53.375	1.875
11	1.277	2.409	55.784	1.277	2.409	55.784	1.851
12	1.243	2.346	58.130	1.243	2.346	58.130	1.879
13	1.124	2.121	60.250	1.124	2.121	60.250	1.418
14	1.070	2.018	62.269	1.070	2.018	62.269	2.588
15	1.048	1.978	64.247	1.048	1.978	64.247	1.411
16	1.013	1.912	66.159	1.013	1.912	66.159	1.333

5.1.7 Convergent validity

Convergent validity confirms whether each item measures what it was theoretically supposed to measure. Convergent validity also refers to how well different loading scores of items indicate the same or similar constructs, and how well multiple measures of the same construct agree with each other (Kerlinger, 1986). Convergent validity is achieved by keeping constructs with reliability values higher than 0.70 (Fornell and Larcker, 1981). As shown in Table 14, the result illustrates an acceptable convergent validity.

Table 14: Convergent Reliability Results

Constructs	Reliability	Question No.
Relative advantage	0.889	15
Costs	0.611	4
Compatibility	0.824	5
IT capability	0.777	8
External influence	0.708	5
Political and legal framework	0.668	4
Management support	0.730	3
E-government development	0.701	7

Average variance extracted

As defined by Gefen et al. (2000), average variance extracted (AVE) attempts to measure the amount of variance that a latent variable component captures from its indicators relative to the amount due measurement error. Therefore, average variance extracted was calculated to ensure that half of the variance of the indicators is accounted for. The AVE for research constructs were above 0.5, which is an acceptable and reliable measure. The average extracted variances were calculated using the following formula (Gefen et al., 2000) and shown in Table 15.

$AVE = \sum \lambda i^2 /$ *provide web*

Note: λi represents the factor loading for a particular item that measures a construct.

Table 15: Average Variance Extracted

Constructs	Average Variance Extracted (AVE)
E-government development	0.707
Relative advantage	0.628
Costs	0.618
Compatibility	0.621
Top management support	0.695
IT capability	0.679
External influence	0.625
Political/legal framework	0.711

5.1.8 Discriminant validity

Discriminant validity refers to how well scale items differentiate between separate constructs (Kerlinger, 1986). Discriminant validity was assessed based on average variance extracted (AVE) values as illustrated in Table 15 above. It is evident that every single construct is different in values from other constructs and that leads to the claim that the measure reveals discriminant validity.

5.1.9 Construct validity

Construct validity is established by showing that the instrument measures the construct it is intended to measure. Construct validity of the e-government success

factors instrument was assessed by using factor analysis to determine if they loaded onto the factors. To assess whether the items of the independent variables and dependent variable constituted different scales of successful e-government development factors, a varimax rotated principal component factor analysis was performed.

For this study, the general criteria were to accept items with loadings of 0.4 or greater. Table 16 indicates that all the loadings are greater than 0.50 and most items loaded properly on their expected factors. The results of the factor analysis indicate that the conditions of convergent and discriminant validity are satisfactorily met.

Table 16: Factor Analysis Loadings

Item	ADV	CT	COST	TMS	IT CAP	EI	PLF	E-gov dev
Adv-1	0.991							
Adv-2	0.903							
Adv-3	0.858							
Adv-4	0.912							
Adv-5	0.855							
Adv-6	0.821							
Adv-7	0.792							
Adv-8	0.785							
Adv-9	0.725							
Adv-10	0.719							
Adv-11	0.719							
Adv-12	0.714							
Adv-13	0.764							
Adv-14	0.621							
Adv-15	0.607							
CT-1		0.892						
CT-2		0.817						
CT-3		0.805						
CT-4		0.782						
CT-5		0.620						
COST-1			0.826					
COST-2			0.775					
COST-3			0.773					
COST-4			0.769					
TMS-1				0.862				
TMS-2				0.858				
TMS-3				0.779				
ITCAP-1					0.983			
ITCAP-2					0.868			
ITCAP-3					0.876			
ITCAP-4					0.822			
ITCAP-5					0.756			
ITCAP-6					0.798			
ITCAP-7					0.752			
ITCAP-8					0.706			
EI-1						0.858		
EI-2						0.821		
EI-3						0.794		
EI-4						0.745		
EI-5						0.727		
PLF-1							0.846	
PLF-2							0.841	
E-gov dev-1								0.901
E-gov dev-2								0.882
E-gov dev-3								0.863
E-gov dev-4								0.845
E-gov dev-5								0.875
E-gov dev-6								0.768
E-gov dev-7								0.738

KEY: Advtg, advantage; CT, compatibility; COST, cost; TMS, top management support; IT CAP, IT capability; EI, external influence; PLF, policy and legal framework.

5.2 Regression analysis

Multiple regression analyses were used for variable relationship testing using SPSS as a statistical analysis package. The purpose of performing a regression analysis is to relate a response, or dependent variable, to a set of independent variables (Mendenhal and Sincich, 1993). As the goal of the survey data analysis was to determine the relationship between variables and the perceptions of the characteristics of innovation, organisational and environmental factors (independent variables), regression analysis was seen as the most appropriate analytical technique. The quantitative data collected via the survey were analysed by performing the following statistical tests:

- Descriptive statistics were calculated to describe the characteristics of the responding information
- An exploratory factor analysis was conducted to ensure convergent and discriminant validity and reliability of the survey instrument
- A stepwise multiple regression was conducted to test the research framework and the hypotheses.

Prior to regression analysis, the data were tested for multicollinearity. Multicollinearity refers to high correlations among the independent variables. To test for multicollinearity, Kleinbaum et al. (1988) suggested computing the variance inflation factor (VIF) for each independent variable and if the VIF of a variable exceeds 10, that variable is said to be highly collinear and will pose a problem to regression analysis. This condition is adopted to check for multicollinearity among the independent variables. Table 17 shows the variables together with their respective VIF values. From the table, it can be seen that all of the VIF values are well below 10, ranging from 0.829 to 1.190. Therefore, there is really no problem of multicollinearity.

Table 17: VIF Values of Variables

Item	VIF Value
Relative advantage	1.184
Compatibility	1.047
Top management support	1.062
External influence	1.011
IT champion	1.080
Costs	0.844
IT capability	0.835
Policy & legal framework	0.829

The validity and reliability measures discussed above indicate that the instrument has the potential for use in further studies of the factors affecting the development of successful e-government projects.

Multiple regression analysis was used for testing the strength of relationships between variables utilising a stepwise method with the criterion of 0.05 for both including variables in, and excluding them from, the final regression model. Initially, a regression analysis was performed to assess the significance of demographics on perceptions about the success of e-government development. All demographic information about the respondents was not significant and therefore not included in the final analysis.

To evaluate the development of e-government initiatives, the researcher regressed the dependent variable against the independent variables. The model explains 59.9% of the variance in participants' views about the factors affecting the successful development of e-government projects; adjusted R Square is .599, $F=76.225$, $p<.0001$. According to the regression results in Tables 18–20, six factors were significant according to the respondents' perceptions. A significant proportion (59.9%) of the variance in perceptions about the successful development of e-government projects is explained by relative advantage, external influence, top management support, compatibility, political and legal framework, and IT capability. Four of the ten proposed factors (complexity, costs, organisation size and IT champion) were found to be insignificant in predicting the successful development of projects in e-government services.

Table 18: Regression Model Results

Model	R	R Square	Adjusted R Square
	0.779	0.607	0.599

Table 19: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	3852.277	6	642.046	76.225	.000
	Residual	2493.228	296	8.423		
	Total	6345.505	302			

Table 20: Regression Coefficients

Model		Unstandardised Coefficients B	Std. Error	Standardised Coefficients Beta	t	Sig.
	(Constant)	9.337	1.180		7.912	.000
	Relative advantage	.718	.042	.685	16.921	.000
	IT capability	-.216	.021	-.463	-10.196	.000
	External influence	-.223	.038	-.266	-5.804	.000
	Compatibility	.153	.041	.145	3.744	.000
	Management support	.184	.065	.105	2.820	.005
	Policy & legal f/work	.189	.082	.090	2.305	.022

The values reported in the table above illustrate the standardised coefficients: i.e. the coefficients that would be obtained if all variables standardised in the regression. The calculated values for Beta coefficients, as well as variables significance for each step, and other coefficients and t-tests, are used to assess the significance of individual b coefficients. For example, Policy & Legal (0.022) is statistically significant, as the cut-off of coefficients having a p-value of 0.05 or less would be statistically significant.

Based on the statistical data analysis above, perceived relative advantage, compatibility, top management support, IT capability, policy and legal framework, and external influence were found to be significant in predicting the successful development and implementation of e-government projects. Figure 6 below presents graphically the six research model variables that were found to be significantly important predictors of successful development e-government projects.

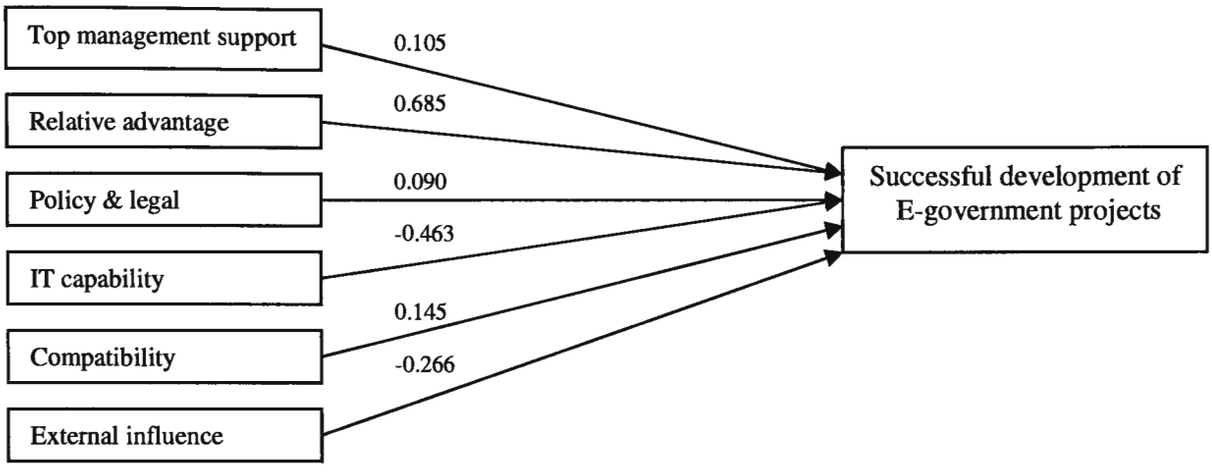

Figure 6: Key e-government Success Factors

5.3 Survey results summary

The survey data were examined in terms of demographic information and statistical analysis. Analysis of the responses gave a picture of the sample body, as shown in the distribution of the respondents by gender, age, education level, work experience, job type, working organisation, and organisation size.

Based on the statistical data analysis, six factors were significant according to the respondents' perceptions. The model explains 59.9% of the variance in perceptions about the successful development of e-government projects explained by relative advantage, external influence, top management support, compatibility, political and legal framework, and IT capability. Four of the proposed ten success factors – complexity, costs, organisation size, and IT champion – were found to be in-significant in predicting the successful development of e-government services projects. IT champion was not found be a significant predictor due to the fact that the perception of champions is not as positive within public-sector organisations as it is in the private sector.

5.4 The interviews

The aim of the following section is to analyse the data gathered from interviews conducted with key government officials at various public-sector organisations in

Oman. The purpose of conducting the interviews was to gather more information regarding the successful determinants of e-government projects and to support the results obtained from the questionnaires data.

5.4.1 Demography

A total of 16 interviewees from several public-sector organisations, primarily four, were interviewed (Table 21). An appointment was scheduled with each of the subjects between November 2006 and January 2007, each interview lasting about one hour. Subjects found the briefing information given by the researcher about the research objectives was useful as a means of concentrating their thoughts in preparation for the interview. The researcher took notes during the interviews and sent follow-up emails where necessary to clarify some points. Purposive sampling, rather than random sampling, was used to select the interview participants using criteria such as their organisation or department's role in using computer-based technology and their interest in participating in the study. All the subjects interviewed were chosen on the basis of their willingness to participate. In general, the interviews were conducted by the researcher in an informal atmosphere.

The interviewees held positions ranging from senior management; middle management and lower management. Each was asked to select as a basis for discussion a single recent project which they were comfortable to talk about, such as the Muscat Municipality e-services initiatives. Basically, the interviewees were asked about their views and perceptions of the development of e-government projects from the technological, organisational and environmental perspectives.

Table 21: Interviewees Demographic Information

Interviewee No.	Organisation	Position	Education Level	Work Experience (years)
1	Information Technology Authority	Head	PhD	18
2	Muscat Municipality	Director-General	BSc	19
3	Muscat Municipality	Deputy Director	MSc	10
4	Muscat Municipality	Assistant Director	BSc	16
5	Muscat Municipality	Director	BSc	12
6	Muscat Municipality	Head	Masters	8
7	Muscat Municipality	Section Head	Masters	7
8	Muscat Municipality	Programmer	Masters	8
9	Muscat Municipality	Programmer	BSc	1
10	Muscat Municipality	System Administrator	BSc	13
11	Muscat Municipality	Programmer	BSc	1
12	Muscat Municipality	Employee	BSc	4
13	Royal Oman Police	Director-General	PhD	17
14	Royal Oman Police	Officer	Masters	9
15	Sultan Qaboos University	Director	MSc	9
16	Sultan Qaboos University	Researcher	PhD	12

With regard to the content of interviews, two methods were used for internal and external checks. Internal checks were used to validate the meaning and quality of a given response in relation to some other reply or piece of data. The most direct internal check involved the use of open-ended questions requiring respondents to elaborate or expound on an idea. In addition, an external check was used to compare each respondent's data with the findings on the same or a related problem collected or reported by others. This is known as triangulation of sources and is similar to the triangulation of methods as discussed in the methodology chapter.

5.4.2 Interviews analysis

The analysis process began with summarising the notes of interviews. Notes and memos were written up soon after each interview as a means of documenting immediate impressions and directions for further inquiry. Interview notes were then analysed using 'open coding' (Strauss and Corbin, 1990). Open coding is the process of selecting and naming categories from the analysis of the data. Variables involved in the phenomenon are identified, labelled, categorised and related together in an outline form. Similar statements, perceptions and opinions were grouped together and a list was compiled of those factors which interviewees had interpreted as critical for the

successful development of e-government projects. The notes of each interview were examined to identify statements that reflected the subject's perceptions and expectations of e-government projects, in terms of their potential to deliver quality and efficiency in public-sector services. The handwritten notes taken during interviews were analysed to identify issues and factors relevant to the various stages involved in adopting and implementing e-government projects. More specifically, the researcher identified a set of factors that might, in the opinion of the interview subjects, have a positive impact on the successful implementation of e-government initiatives.

Based on the data collected from the interviews, it appeared that the factors more likely to affect the development of e-government initiatives tended to be managerial and environmental rather than organisational issues. The key factors identified for implementing successful e-government projects were ranked based on computing their median and mean values respectively and are shown in Table 22.

Table 22: Key Success Factors

No.	Key Factor	Median	Mean
1	Technology supporting e-government projects	26	26.69
2	Understanding the customer needs & compatibility	21	21.56
3	Incentives	16	15.74
4	Easy access & low-cost services	15	14.70
5	Publicity & awareness	14	14.90
6	Commitment at the senior level	12	11.34
7	Champions	8	7.94
8	Government policy & legal issues	7	7.52

This initial analysis suggests that government officials realised the importance of implementing e-government projects. One official described what he perceived as the attitude of employees towards his organisation's change to providing online services, stating that they were somewhat reluctant at the outset.

In general, the interviewees did value and appreciate the emerging benefits of adopting new technology projects within their public-sector organisations. However, they also expressed the view that the introduction of new technology such as e-

government projects needs more time to be absorbed by employees as well as by the public. Most, if not all of the subjects also agreed that the citizens of Oman were not yet ready to accept the concept of e-government.

According to one government official interviewed, 'e-government in Oman is conceived as a means of improving services to businesses and citizens, promoting economic and social development, and improving the effectiveness and efficiency of internal government operations'. The government has issued tenders for the provision of consultancy services in developing e-legislation to support the Oman digital society and e-government initiatives.

The following sections summarise the data gathered from the interviews and outline the perceptions of the interview subjects about the introduction of e-government projects in Oman.

5.4.3 Relative advantage

The introduction of e-government in public-sector organisations will offer many key benefits such as increasing the efficiency and effectiveness of those organisations, improving the quality of their services and reducing operational costs. All subjects agreed that the introduction of e-government projects in place of existing paperwork-based methods would add positive value to their organisations.

The goal of introducing and implementing e-Oman is to leverage ICT power for economic and social benefits. There are many initiatives being undertaken by e-Oman including the integration of government departments to provide more efficient public services, increasing IT literacy, developing the economy through smart electronic services, creating local knowledge-based industries and minimising the Digital Divide.

'e-Oman will offer every citizen, business and government entity in Oman a wide variety of convenient, cost-effective and customer-oriented electronic services that will empower [them] and transform life for the better', as one government official expressed it.

Muscat Municipality is a pioneering public service organisation in terms of employing web-based applications and providing some e-services to the public. The staff portal enables Muscat Municipality to create a coherent organisation while giving employees access to a diverse range of integrated applications and information

with a single sign-on. Staff members have a single focal point for all their productivity tools and all the data they need to perform their daily tasks. They no longer waste valuable time searching for information, and they can gain access to previously inaccessible data located in other departments and offices.

'There have been huge improvements in employee productivity. The reason we have been successful in providing some e-services is because we have a vision that we're trying to achieve. We put up targets for ourselves and planned it out well', commented one official from the Muscat Municipality.

Sultan Qaboos University uses its own e-government initiative for student registrations and many other purposes. 'It reduces the load of data entry by having students fill their own applications etc. Therefore [it is] compatible with [the] need to minimise new staff hiring. From our own e-government work I think it is as easy as most web-based applications. I can not speak for other e-government [initiatives] as I have no experience with them.'

Issues such as standardisation of government procedures, reduced data entry, greater accuracy and greater availability of information to improve decision-making were mentioned by interviewees when asked about the benefits they expected from e-government projects. When they were asked about the motivations of a public organisation to develop e-government initiatives, subjects stated that when users fill in their own data using standardised formats, greater accuracy is achieved and users have direct access to their information; this also reduces tedious and time-consuming customer service counter work

5.4.4 Compatibility

People in Oman who have adopted the mobile phone, ATM technologies and Internet surfing will adopt e-government services. As one interviewee commented, 'In my opinion, e-government [has] already changed and replaced the classic market place. From the beginning our existing computer system [was] designed to integrate with e-government systems, so they are compatible. For example, you find in our website a program called M-Rial which is a good example of an e-government live application.'

An official from Muscat Municipality stated that 'Muscat Municipality is using web-enabled applications and [has] already started deploying some online

services for public use and currently there is integration between Muscat Municipality and some of the Ministries for query purposes.'

5.4.5 Top management support

No introduction of an ICT initiative into an organisation will proceed very far if that initiative does not have support. One government official commented that there was encouragement and support for employing new technology within their organisation, stating that '...it is largely positive but they only know it as "web based" or "computer systems" [Muscat Municipality official]. I think the expansion of the core computer systems has been continuous and there has been no turning point where suddenly the organisation is setting up "e-government"'. The level of management support in Oman is very encouraging for the introduction of e-government projects – as was evident from the interviewees' understanding of the need for commitment to promoting e-government projects. Good examples of such commitment are the senior management of Muscat Municipality, Royal Oman Police and the Oman Tender Board, who are providing support for the e-services initiatives of their respective organisations.

'The Sultanate's Civil Status record system has won the prize for the best e-government application project in the Arab world. This was announced at a ceremony held to honour the winning projects in a world summit for the information society, which was held in Tunis [in] 2005', stated an official from Royal Oman Police. That prize reflects the level of support given to the project by the organisation's management.

The collective support for e-government projects within various organisations was highlighted by one Muscat Municipality official: '... currently we have our employees in MOCI working on the "One Stop Shop" project which is a real application of e-government services'[Muscat Municipality official].

5.4.6 Champions

Most of the interviewees agreed on the need for and importance of a champion for the long-term success of e-government projects. One government official elaborated that 'There is no label of "e-government" used or needed in the organisation to get things

done. Most of the projects are championed at higher level by the director of the Computer Centre.' Another interviewee stressed the important role of the Information Technology Authority (ITA) as a national champion overseeing the government's 'Ubar Portal'.

'Yes, we are building whatever it came in the picture externally or internally. Currently, [the] Ministry of National Economy (MONE) is taking care of building [an] e-government portal site to provide all the different government sector services from a single point' [Muscat Municipality official]. One government interviewee highlighted and praised the positive role and the establishment of an independent body in Oman, Information Technology Authority, in leading the vision of e-government, the development of standards and infrastructure, laws and legislation, to narrow the gap in coordination between the various government entities that have plans to establish e-government projects and provide public services to citizens and the private sector.

5.4.7 Government policy

The Telecommunications Regulatory Authority (TRA) was set up under the Telecommunications Regulatory Act, which was issued under Royal Decree No. 30/2002. The establishment of TRA was a step in the direction of liberalising the telecom sector. According to ITA's Executive Officer, ITA is responsible for the country's digital infrastructure initiatives such as the Ubar Portal, Government Network, e-Payment Gateway, e-legislation and the Digital Oman awareness campaign that will help create increased ICT awareness among people and provide better government services to businesses and citizens. He added, 'ITA is also working closely with various public- and private-sector organisations to introduce various innovative and pragmatic IT literacy measures that ensure that the people of Oman can make the best of the benefits offered by a Digital Society' [ITA official].

He went on to say that 'ITA is also responsible for projects such as implementation structure setup, implementation of [a] service delivery model and e-government technical architecture, ministerial process re-engineering, national telecommunications upgrade and quick-win projects in association with various entities' [ITA official]. The interview results reflects the significance of the establishment of the Information Technology Authority (ITA) by Royal Decree

52/2006 in terms of the commitment of the Omani government towards an all-encompassing Omani digital society. In addition, one key government source stressed the efforts by the government to promote and increase the penetration of Internet usage in Oman and to encourage public-sector organisation plans for implementing e-services.

The government of Oman signed an agreement with a local commercial bank, Bank Muscat, to launch the national e-payment gateway to provide an e-governance infrastructure including full e-commerce facilities that will allow safe, secure online payments in the country [ITA official]. The Chairman of the Information Technology Authority hailed this e-payment gateway as another significant milestone in the implementation of the e-Oman strategy and it will enable e-government shared services to be paid electronically using major local and international credit and debit cards. In fact, the introduction of an e-payment gateway is considered to be a key enabler for the successful delivery of public-sector services online and will help the uptake of the e-services due to its efficiency and ease of use. The initiative is part of the continuous efforts taken by the ITA to build an e-government infrastructure in Oman.

5.4.8 Incentives

It is normal practice to leave current government service delivery systems in place and offer citizens the choice of continuing to receive those services by traditional methods. In order to increase the rate of adoption of e-government services, some sort of incentive must be introduced – such as those offered by Muscat Municipality [one Muscat Municipality official]. When asked about possible incentives to increase the adoption rate e-government initiatives, the issues most often cited by interviewees were: providing training for the public in using computers, allocating budget and providing low-cost services. One subject also highlighted the lack of personal incentive for managers to take up e-government projects.

Issues such as the effectiveness of government services, providing best practice, and projects aimed at developing more customer-oriented organisations were cited as additional incentives to accelerate the adoption of the e-government services. In addition to those incentives, one subject indicated a need for Oman's Internet service provider (ISP) – which is currently Omantel – to provide the local market with

upgraded services at reasonable prices. The same subject stressed that Oman could attract more ISPs to enter the Omani market, thereby providing better services and increasing the level of competition between ISPs. Another interviewee suggested introducing a funding scheme for individuals who are starting to adopt e-government.

Based on the interviewees' perceptions, the size of an organisation in terms of manpower is not a significant factor in the decision to make use of new web-based technology projects such as e-government. This may well be true for Oman, as the public organisations are centralised.

5.4.9 IT capability

All the initiatives taken by the government in the last few years have begun to yield excellent results. Today, Oman offers a wide range of telecommunications services based on mobile and fixed networks across the various regions and wilayats. (Oman is divided into 51 administrative wilayats, touching the lives of all citizens.) The healthy competition between Oman Mobile and Nawras has made the mobile market more consumer-friendly; as both operators are striving hard to offer consumers the best services at the most affordable prices. In 2004, Oman Mobile was set up as a subsidiary company of Omantel, dedicated to providing mobile services in Oman. In 2005, the mobile market was thrown open for competition resulting in the entry of the private operator, Omani Qatari Telecommunications Company (Nawras), as the second mobile service provider.

'It's not about just being knowledgeable or computer literate. In fact there are many stages that need to be implemented such as team spirit, employees' motivation level and many others. If all these factors are assured then the number of computers won't be counted as a priority' [Muscat Municipality official].

The telecom market in Oman is looking towards a bright future. International telecom companies have already shown keen interest in setting up and expanding their operations in the Sultanate. 'As seen already in most of the markets across [the] globe where the mobile services have grown at a very fast pace, the fixed line growth has come under tremendous pressure in Oman too. The fixed line subscriber base has grown marginally in the last one year, 2005' [Muscat Municipality official].

Currently, the important role played by information and communications technology (ICT) in speeding up and sustaining the development of nations as well as

in bridging the digital divide is globally recognised. The innovative 'Oman 2020' economic development vision aims to expand and diversify the Omani economy and enable it to participate in the global economy. Accordingly, His Majesty Sultan Qaboos bin Said's Government has paid special attention to ICT as an enabler of its development strategy which is aimed at devising and adopting modern, high-value production methodologies and tools, thus realising the Government's purposes and goals of sustainable, comprehensive growth (Ali, 2006).

As one interview subject expressed it, 'Our development strategy rests on a vision [of] mandating and expanding the adoption of ICT and scientific progress in availing automated and electronic access to services and information for the Omani society wherever and whenever possible. Therefore, we have formulated our Digital Society strategy utilising a comprehensive, unified and integrated methodology aimed at building Digital Oman and availing government services electronically to citizens and business.' The same person elaborated, 'As part of our continuous efforts aimed at laying a solid foundation for an Omani knowledge-based economy, the seventh five-year plan (2006-2010) has put strong emphasis on developing the Omani ICT sector through a phased implementation of the Digital Oman strategy and focusing on building the foundation for electronic service delivery while allocating special priority to development and research work' [ITA official].

E-commerce is taking shape in the Sultanate (Al-Harthy, 2006a). One subject commented, 'It is pleasing to see that the government has taken very positive steps towards that goal. The Information Technology Authority (ITA) – the government body overseeing these initiatives – has launched an e-Oman awareness campaign, which highlights the initiatives taken towards a comprehensive digital society. ITA is working on a major project to launch the Ubar Portal, which will act as the main gateway to all e-government services. It is hoped that many of those initiatives will empower people and transform the character of e-commerce in Oman.'

He added, 'Oman's economy is booming and government, private-sector and consumer spending are at an all-time high. The increased economic activity means more business opportunity for us'. The IT infrastructure is also improving in the Sultanate and the number of people using mobile services in Oman has increased dramatically since the market was deregulated.

Accordingly, in order to establish the foundation for IT infrastructure, the government has contracted Oman Telecommunications Company (Omantel) to

implement a Convergent Government Network (CGN) through several phases, already started with the successful implementation of a pilot project to link four ministries. One government official commented '...we are currently preparing to roll out the remaining network implementation phases to include all government organisations and units. Also, we are currently evaluating proposals for implementing Ubar Portal, the government electronic services gateway. The initial phases of Ubar Portal planned to include an electronic payments gateway, electronic government application forms and some integration of applications within the e-government infrastructure. This will open up a window for accessing government services online'.

Along the same path, the government has begun to implement several projects such as the National Registration System, Smart ID cards for citizens and residents, the One-Stop Shop for businessmen and the enhanced Commercial Registration System. Work is currently under way with a number of government organisations to co-ordinate the implementation, integration and linking of other projects to the e-government infrastructure within the current five-year plan.

The convergent government network is an e-governance infrastructure that will support other e-government initiatives and ultimately improve service by providing the structure through which government organisations to be linked. It will interconnect all ministries and government entities (head offices and their branches across Oman) and the various e-services provided by them. This innovative, managed network service will have the capability of supporting data, voice and video over the same infrastructure and will ensure service delivery according to predefined and guaranteed Service Level Agreements (SLAs).

A pilot network has been running successfully for almost a year and the test results have been very encouraging. An ITA officer commented: 'We plan to roll out the service once we finalise the requirements and readiness of all the entities covered in this, besides tying up the logistical details like bandwidth and other infrastructure requirements with Omantel. It is going to be a long and continuous process which will be completed in progressive phases'.

ITA's chief executive expressed the view that 'I think Oman's economic development depends on its people extending their ability to be a clever and dynamic country, that is, by ensuring citizens and communities have access to ICT and the Internet' [ITA official].

As the gateway to Oman's digital society, the Ubar Portal will enable access to all government websites and their e-services in a seamless manner through a single entry point. It will enable the performance of e-government from the focus of Communities of Interest through a range of service delivery channels. It will act as the Government Nervous System (GNS) through which all the government agencies will be able to share information with each other. The concept of Communities of Interest (COI) is currently being implemented in Oman, according to Gartner Consultancy recommendations (National Committee for Information Technology, 2003), the idea behind this concept being to link similar public organisations under one umbrella to provide their services. Its aim is to avoid the repetition of processes when dealing with facilities such as public schools or post offices.

Oman Arab Bank has installed five FastBank machines in the capital of Muscat, enabling users to deposit cash into their bank account, pay electricity and water bills (in the Muscat area only), pay Omantel fixed telephone and Internet bills, settle Oman Arab Bank Visa Card bills and pay Oman Mobile and Nawras GSM bills. All of these services are available 24/7 and come with an instant automated receipt.

According to Abdul Kader bin Ahmed Askalan, CEO of Oman Arab Bank, OAB's Internet card which was launched in 2003 has been well received and usage of the Bank Smart Card is showing steady growth with the addition of new shopping outlets accepting the card (Askalan, 2006). 'Government departments have also approached us to install Smart Card payment systems at their counters', added Askalan. The Smart Card electronic payment system allows corporate and retail customers to pay customs duty, labour department levies, fees at the Ministry of Commerce and Industry and Oman Chamber of Commerce and Industry (OCCI). In addition, individuals can load money onto the Smart Card and use it as currency to shop at various locations.

With the recent growth in e-government services, the Royal Oman Police (ROP) and Nawras have joined forces to develop a digital link between the two entities that enables Nawras to activate lines over the phone by using a customer's civil ID number to verify personal information in a secure environment. The customer must explicitly approve the terms and conditions, clearly indicated on the Nawras package, which authorise such checks.

As another government official stated, 'The ROP e-initiative is seen as an important step in helping to shape e-government practices in Oman, one that has

redefined traditional business conduct for both the ROP [and] the Sultanate's telecommunication industry'. With Nawras, the photocopying of ID cards has become a thing of the past; instead, relevant personal information is checked instantly through the ROP's civil ID database, making it easier to multiply sale channels to 450 outlets across the Sultanate with a minimum of logistical and overhead requirements.

According to an ROP official, 'ROP supports e-government initiatives through this electronic integration. [It] is a positive move in the right direction, which is likely to pave the way for [further] integration in the future within the e-government framework'.

5.4.10 Easy access and low-cost service

Several senior officials interviewed cited easy access, time-saving for citizens, businesses and employees, and better and cheaper service among the benefits to emerge from e-government initiatives.

According to a high-ranking government official, 'We do agree that we need to work on increasing the PC penetration in Oman so that every citizen could make use of the Internet for their social and economic benefit. Besides upgrading the Internet support infrastructure, the government is working simultaneously on improving the Internet-based services in the Sultanate'.

According to Al-Harthy (2006b), Oman's Transportation and Communication Minister, 'Internet and related services is another area in which we are working in close conjunction with other ministries and corporates to convert our vision of "Digital Oman" into a reality. When we talk Internet penetration and usage in Oman, we must keep one important factor in mind: that there are always multiple users using one subscriber line. For example, in many companies, a large number of their employees use the Internet for their information needs. Similarly, those who are on the move or don't have access to a PC use cyber cafes to surf the Internet. So though the subscription rate may not be very high, there are far more Internet users in Oman than the subscription figures suggest.'

5.4.11 Legal issues

In view of the importance of establishing relevant e-legislation to govern and organise electronic transactions and its role in supporting the broader digital Oman and e-

government initiatives, new e-transactions laws have been drafted and are currently being reviewed by relevant authorities.

Oman's digital society initiatives require substantial legal protection for the various entities in the use of ICT for official and personal communications and transactions. Also, to increase the trust that citizens and businesses have in electronic transactions, ITA has initiated the formulation of e-legislation for electronic transactions in Oman. According to one government official, the forthcoming e-laws will address key issues such as validity of e-transactions, intellectual property protection, taxation and data protection, legal recognition for electronic signatures, admissibility and evidential aspects of data messages, electronic payment validity, jurisdictional matters, issues of electronic messages and protection for privacy and security.

According to one interviewee, one of the most important reasons underlying the success of e-government applications is legislation, in addition to the infrastructure that must be completed in order to facilitate communication. Adapting the existing laws to e-government services provided over the Internet would present a great challenge to public-sector organisations, as these laws do not encompass such a new way for government to deal with its customers, one interviewee stated. The new e-transaction law, which was formulated by a professional law office in Oman, will help smooth the transition to e-government as well as raise the level of security and foster the public's trust towards adopting and using e-government services.

The absence of a legislation framework that could support ICT project development is at least partly responsible for the low uptake of e-commerce in Oman, one interviewee noted. However, he stated, the development of a new e-legislation framework would promote confidence and build trust in the beneficiaries of government services.

5.4.12 Publicity and awareness

Another factor to emerge from the interviews concerned the lack of public awareness and education about the benefits of e-government, although it was acknowledged that the ITA had run many awareness campaigns throughout the country since April 2006. According to the Secretary-General of the Ministry of National Economy, 'e-Oman will offer every citizen, business and government entity in Oman a wide variety of

convenient, cost-effective and customer-oriented electronic services that will empower [them] and transform life for the better'.

The ITA has begun conducting a number of seminars and workshops on a monthly basis to government IT staff and personnel involved in providing electronic services. These are aimed at introducing the ITA-developed e-government IT Governance Framework, its associated IR standards and implementation policies. Further, an agreement has been concluded with the Ministry of Civil Services to conduct a series of training programs such as the International Computer Driving Licence (ICDL) and the Internet & Computing Core Certification (IC3) for civil servants to develop their core IT skills and prepare them for active participation in delivering government services electronically.

'We are launching a nationwide awareness campaign, using all available media tools, covering not just the major places but also the interior regions. The campaign will disseminate information about our activities and how people at large are going to benefit from the launch of these e-services. If people are not aware of the existence and benefits of the e-services we are working on, the entire exercise will be futile', said a government official involved in the Digital Oman project.

One government official stated that 'The success of the Digital Oman initiative depends on how well Omani society is being prepared and empowered to transition to a digital society, and on the successful implementation of the IT infrastructure and the National Strategy projects'. A number of skills development and training programs, spanning all sectors of Omani society, have been planned in co-operation with ministries and government organisations as well as through partnerships with the private sector, in order to benefit from training programs and systems offered by global companies such as Microsoft, Cisco, Oracle, IBM and others.

Another government official stressed the need for training the Omani people to be able to use e-services in the future: 'We will provide training to people on how they can use these services. We have an agreement with the Ministry of Education for using the labs in their schools to arrange training sessions for the common citizens.'

He added that 'Low penetration of PCs and the Internet is definitely a major problem. We are in touch with Omantel and other companies to make PCs and the Internet available to the public by offering attractive deals. Omantel is already running a major campaign to encourage the public to subscribe to its Internet services

by bundling in ownership of PCs and laptops in an attractive, instalment-based plan. The Sanad programme by the Ministry of Manpower is also establishing service centres across the country, offering Internet usage on PCs to help people in making use of e-services. The Ministry in association with [a] private company is helping young Omanis to set up such centres with easy loans, infrastructure and know-how.'

5.4.13 External influence

A member of the Sultan Qaboos University academic staff stated, 'There was considerable pressure from outside to use our staff in developing a national-level admissions centre based on our software and expertise and I see little pressure apart from this instance but others in the organisation have much more contact with outside organisations than I do'.

The interview subjects highlighted the level of external influence brought to bear on public organisations by the private sector in Oman. That influence was characterised in terms of an IT culture in Oman being spread through partnerships with various private-sector companies including large multinational companies such as Microsoft and Cisco. As one government official commented, '...the external influence was helpful and is particularly useful in securing budget which is one of the key success factors for any initiative'. Some interviewees speculated that there will be a demand for government services electronically in the near future, in view of the fact that mobile service penetration rose quickly in Oman. In addition to that, interview results revealed that Oman could expect to be influenced by the private sector as well as the GCC countries in terms of the need for rapid development of e-government services.

A key Muscat Municipality interviewee stated that in response to a demand from people for online car parking enquires and reservations, the Municipality developed a system which enables the car drivers to pay their parking fees via SMS service. Furthermore, the Royal Oman Police established a mobile service that allows drivers to enquire and receive information about their traffic offences.

5.5 Chapter summary

The chapter began by analysing the research data collected using questionnaires distributed to public-sector employees in Oman. The data analysis involved compiling

demographic information about the respondents, the performance of reliability and validity checks, and the testing of relationships between variables. The survey results indicated the generally-held view of respondents that e-government projects could assist the interaction of citizens and private-sector organisations with government entities. Statistical analysis carried out on the survey data revealed six independent factors that were seen as significant in the development of e-government initiatives.

The second part of the chapter analysed the data collected from 16 interviews conducted with key government officials. The goal of these interviews was to supplement the results obtained from the questionnaires as well as obtain more insight into the development of e-government projects in various organisations. The interviewees revealed considerable understanding about the development of e-government projects. Based on the interview data, a list was captured of key factors for the successful development of e-government projects within Omani public-sector organisations.

The findings of this study help to explain the types of factors that facilitate the successful development of e-government initiatives and reveal the importance of management support to that success.

Table 23 illustrates the combined results of the data analysis in answer to the research question. This table lists the key factors for the successful development of e-government projects.

Table 23: Research Findings Success Factors

No.	Key Factor
1	Relative advantage
2	Compatibility
3	Easy access and low-cost service
4	IT capability (technology supporting e-government projects)
5	Top management support
6	IT champions
7	Incentives to use e-services
8	Government policy and legal issues
9	Publicity and awareness
10	External influence

In the next chapter, chapter six, the results obtained from the data analysis will be discussed thoroughly. Specifically, the key factors identified will be examined in more detail.

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6 DISCUSSION

The aim of this chapter is to discuss the results set out in the previous chapter. To recapitulate, the objectives of this research were to assess the determinants for the successful development of e-government projects in public-sector organisations in Oman. In addition, the research reviews the current situation and ways to achieve the overall aim of establishing an e-Oman digital society.

6.1 Results overview

In response to the research questions, the study results identified that technological factors (such as relative advantage, compatibility and access), organisational factors (such as top management support, incentives, IT champions and IT capability) and environmental factors (such as external influence, awareness campaigns, policy and legal issues) play an important role in the successful development of e-government projects – as summarised in Table 23 in the preceding chapter. It is apparent from the factors mentioned above that a combination of technological, organisational and environmental factors leads to the success of e-government projects. The research findings especially the survey data results confirm the existing literature on e-government development. The research results suggested that the more useful people perceive new technology (such as an e-government project) to be, the more positive their attitudes tend to be toward using that technology. Relative advantage, compatibility, top management support, government policies and other factors appear to be strong predictors of successful e-government projects.

The research results illustrated that e-government services are likely to succeed if certain key factors are taken into consideration – such as top management support, easily accessed and low-cost telecommunications services, privacy and security guarantees and building of the organisation's IT capabilities. In addition, the study results revealed that the respondents shared a general agreement with the expected benefits of adopting e-government services, as they believed that e-government can improve the delivery of government services to citizens and the private sector.

There is evidence from the research results which stresses that Oman will need to resolve several issues whereby existing strategies and policies are inadequate to address new kinds of internal and external relationships, or to exploit new delivery

channels; people may strongly oppose and/or fear change; business processes developed for a hierarchical organisation will prove inadequate to support e-government initiatives; and new technologies and architectures must be identified, sourced, implemented and managed.

When survey participants were asked about the obstacles they perceived to the development of e-government projects in general, the results revealed that there are many limitations hindering the development of e-government projects in Oman including the poor telecommunication services; trust, privacy and security issues; the lack of training programs for the public; and inadequate e-legislation. The research results indicated issues such as the limited availability of broadband and high Internet access costs are major obstacles to the future development of e-government projects. Funding for such projects is another limitation and the results highlighted the need for government to utilise its resources and foreign aid to finance such projects.

The research results revealed other barriers and challenges facing the application of e-government initiatives, including the lack of integration across government departments; shortage of skilled human resources; and lack of suitable telecommunications infrastructure. In addition to those obstacles, at the administrative level there is a great need to provide the material possibilities of information technology on a nationwide basis. This technology is in a state of constant evolution, which makes keeping track of the developments difficult. Further, technological developments are often complex and of necessity integrated; therefore they must be adopted in one installation rather than through a staged process, particularly within a single organisation.

6.2 Detailed discussion of study results

6.2.1 Relative advantage

It was acknowledged by study participants that the introduction of e-government would raise the level of efficiency and effectiveness in the government sector by facilitating and accelerating the delivery of services. The real benefit of e-government projects lies in delivering time savings and convenience for users, rather than in reducing costs. The results of this study indicated that the public will be able to interact with public organisations through the Internet to increase the speed of response, provide services and information in a timely fashion, and simplify

procedures. These benefits will in turn reduce costs and increase the demand for jobs and services required by the new system. The most interesting finding was the perception that the introduction of e-government projects would help to attract more skills and expertise to public organisations. In addition, it would attract international companies operating in the field of advanced technology to Oman.

As mobile phone adoption in Oman is very positive and increasing steadily (over one million subscribers), it is expected that many people who perceive services such as mobile phones to be advantageous will also be likely to adopt e-government services. If the perceived benefits of easier communication, networking, system integration and the provision of timely, relevant, complete and useful information are not realised, then the system will be perceived to have failed.

6.2.2 Compatibility

Prior studies, such as Carter & Belanger, 2004; Hinnant, 2002, have noted that the degree of compatibility of new projects such as e-government could affect a successful development and implementation process. The results of this study showed that e-government projects would be accepted by employees if they were found to be compatible with work practices within their organisation; it was also expected that the more extensively individuals use the Internet, the more likely they will be to adopt e-government services. Most public-sector organisations in Oman have operated websites for quite some years now and have a web presence (see Appendix F: Oman Public-Sector Organisation Websites). Traditionally these websites have been used to provide some dynamic services such as filling in of forms, lodging enquires, etc. The study results suggested that citizens who have adopted those services in the past will have a stronger tendency to use e-government services than those who view the currently available services as incompatible with their lifestyle.

In addition, the results showed that many public organisations had adopted computer systems for many years and therefore e-government projects in general might be compatible with those organisations' existing work practices. However, the respondents pointed out that more effort needs to be made by public-sector organisations in terms of the technological compatibility of both hardware and software. They also highlighted that e-services should be user-oriented if they are to be accepted and compatible with existing work practices. Furthermore, the research

results suggested that lack of technological readiness on the part of citizens will limit their usage of e-government as much as limited Internet access will.

One of the issues highlighted in this research was the need for an appropriate balance between centralisation and decentralisation. The results suggested that there should be some sort of independent decision process enabling public organisations to accelerate their e-services initiatives in a decentralised manner. It is expected that higher levels of perceived compatibility are associated with stronger intentions to adopt e-government initiatives. It is also expected that both citizens and government organisations who have adopted Internet-supported initiatives are likely to adopt e-government services. Citizens who have adopted e-commerce initiatives can be expected to view e-government initiatives as compatible with their lifestyle.

It is admitted, however, that some factors could slow the development of e-government projects. Certainly the most important and critical limitation is the digital divide that exists between 'those who know' and 'those who do not'. In the Sultanate of Oman, most of the digital divide problem is expected to be very obvious in areas outside the capital city of Muscat but there are very encouraging government initiatives to narrow down this issue by promotional campaigns. Therefore, the research recommends that there should be a movement towards upgrading in terms of technological equipment, staff skills and training within public-sector organisations throughout Oman.

6.2.3 Access

The study results indicated that e-government projects will be useless unless they are accessible by a large number of people. Committed to increasing the levels of PC penetration within Oman, the government has initiated a project for providing low-cost PCs pre-loaded with licensed software and with Internet connectivity. Measures are in place to address the bridging of the digital divide by undertaking targeted messages to reach the whole society.

Multiple-contact channels are needed for remote places in Oman in order to reach a large part of the population. It is known that Internet penetration in developing countries, including Oman, is low compared with the developed countries. Therefore, other channels of providing public-sector services could be used including mobile phones, kiosks and ATM machines. Also, mobile units could be used to reach remote areas which lack mobile phone coverage and access to ATMs.

The development of government services through modern delivery channels presents a range of issues for public-sector officials. In order to achieve value with their technology choices, organisations delivering or planning to develop e-government projects need to demonstrate quick responses to the issues of cost-effective service delivery and the efficient acquisition and optimisation of infrastructure and services. The results of this study indicated that e-services initiatives should not be limited to the Internet; participants showed a preference for utilising the existing mobile phone services and also suggested setting up service centres in major public areas such as shopping centres.

Government e-services require extensive efforts from government organisations to ensure their successful delivery, with measurable value and effective usage by customers. The introduction of government e-services will mandate significant changes to the government's business, technology and organisation.

Government-sector organisations in Oman should adopt best practices and align their business objectives with technology to provide citizens with citizen-centric government services. Technology is an enabler that, when coupled with new methods of operation, can provide fundamental improvements in public-sector efficiency, speed, citizen satisfaction and finances.

Access will not be limited to Internet web access but extended to cover various access channels such as mobile phones and personal digital assistants. Other access channels will be added in later phases. Successful implementation requires an understanding of which services are in high demand and what incentives are required for users to go online. Depending on the e-readiness of government organisations, the appropriate channels for service delivery need to be selected – whether Internet, ATMs, mobile phones, or kiosks in public places.

The most interesting finding of the study was the importance that participants placed on identifying which government services will be made available through e-government. The study highlighted the necessity for public-sector organisations to prioritise the services they will initially offer online. Based on worldwide best practice, it is advisable to select those services – such as the One-Stop Shop initiative of the Ministry of Commerce and Industry – that can pay for themselves and create a margin large enough to finance other e-government projects. Services that should be prioritised are those that will improve revenue collection, improve financial management and create a better environment for investment.

Government plans should include various electronic channels and electronic gateways to provide multiple services, as well as the joint construction of the electronic structure of government across governmental units.

6.2.4 Incentives

The research findings demonstrated the crucial role of incentives in overcoming the resistance to organisational change. For example, citizens need to be asked proactively for feedback; by involving the public before and during the implementation of e-government projects, organisations will ensure that services are relevant to the public, guarantee high adoption rates, create a feedback channel to key e-government officials and solicit ideas for the introduction of new services or improvements to current services (Heeks, 2003e). As e-government projects are designed to offer services to users, it is therefore necessary to involve the users in the implementation process in order to maximise the probability of a project's success through this new channel of feedback.

Usually, public-sector organisations hire young people and provide them with intensive courses in various disciplines. This is a costly exercise and the nature of the work required from these skilled young people is very sensitive. Unfortunately, it is too often the case that once employees become experts, they resign and go to work in private-sector organisations, especially banks, insurance agencies and oil and gas companies, where the conditions are more attractive than in the public sector. It is known that public-sector organisations serve thousands of people on a daily basis and any delay in the services provided, due to skilled staff being unavailable, may damage the organisation's reputation. Therefore, there is a need to train staff with as much care as possible. As one government official pointed out, this is an observable pattern and one which costs public organisations a lot of time, effort and money. It is a problem that must be solved through collaboration between the public and private sectors.

The ideal solution is for creative people and those working enthusiastically in the area of electronic information to be given incentives and conditions that are clear to all, so that the incentives are awarded to only the most deserving and outstanding employees (Atallah, 2001). This will provide government organisations with a stable employee base that can carry out the work easily and smoothly.

Some government officials expressed a fear that employees within public organisations are not asked for their opinions during the introduction of IS projects. Therefore, public-sector officials in the initial development planning stage should include civil servants in order to give them a measure of 'ownership' of the process and the product. It is important to seek their input to create in them a sense that they are a part of the project's success; this in turn will motivate them to spread the concept of e-government to other members of the organisation.

In addition, the research results revealed that incentives such as promotion, awards, or financial rewards should be given to those who provide support and enthusiasm in the workplace (Al-Shihi, 2006). The study findings also recommended that government employees should be evaluated for promotion, pay rises, or attending training courses using objective performance criteria rather than networking. In general, there are few incentives offered within the government sector and this has led to a scarcity of expertise in the field of information technology. By contrast, the incentives offered by the private sector including high salaries, training and moral support, have attracted technical experts and created a technological divide between the two sectors.

6.2.5 Management support

The research results emphasised the role of leadership in the success of e-government because it ensures the long-term commitment of financial resources, personnel and technical expertise in the design, development and implementation of e-government projects. It was evident that the commitment of management will guarantee support for e-government initiatives at all levels of government, maintaining a sense of urgency to complete an e-government project as well as involving the public and meeting their needs and expectations. The study also highlighted a general lack of understanding within the public sector of the importance of long-term plans for the introduction of e-government initiatives in terms of their requirements and the challenges to be faced. This issue need to be addressed in advance to secure the successful development of any initiative and to guard against its failure in the future.

Top management support for e-government projects was found to be critical to the success of those projects (Moon and Norris, 2005b). The success of e-government services relies on the quality of information systems that are powered by an electronic

database. The support of top management helps provide the political will that can bring disparate departments together and overcome the communication and coordination barriers between government organisations. The other critical function of top management support is to deal with organisational resistance.

It was acknowledged that effective planning and implementation of e-government projects requires commitment and careful planning, as well as a shift in the paradigm as to how IT program investments are evaluated. 'In today's collaborative environment, successful IT programs are those that bring value to the enterprise as a whole' (Salem, 2007).

The interviewees stressed that government e-services require extensive efforts from government organisations to ensure their successful delivery with measurable value and effective customer usage. As stated earlier, the introduction of government e-services will mandate significant changes to the government's business, technology, and organisation, and these changes will involve significant new IT infrastructure, security and software technologies that will impact on existing IT environments. They will also have an impact on existing business environments by introducing e-service business processes, as one interviewee explained.

The successful implementation of e-government requires strong leadership and vision. It must also address line management and employees' resistance to change by the use of marketing campaigns. Of the several variables affecting the success of any e-government project, the most important factor is top management support and influence. The key to the success or failure of any project is the commitment of top management to support each point of the strategies within the organisation, in addition to providing a suitable organisational structure to counter employees' fear of the consequences of this change (Hinnant, 2002).

The research results illustrated that public-sector organisations must change their ways of using technology and initiate cooperation between the private and public sectors to find methods of efficient and effective service delivery to the public.

Resistance to change involves several factors in addition to changing positions of power and responsibility (Gant, 2004). The study participants emphasised that the success of e-government depends on the cooperation of various public organisations, their integration with each other and the allocation of adequate budgets. In order for public organisations in Oman to develop successful applications of e-government, they must focus on these factors before embarking on the implementation process and

not jump from one phase to another before ensuring they have prepared the ground adequately.

The study results pointed to a need for the establishment of an independent body to lead the vision of e-government, the development of standards and infrastructure, laws and legislation, and to plug the gap in coordination between the various bodies that have an influence on the establishment of e-government to provide public services to Omani citizens.

6.2.6 IT capability

Despite the efforts being made by the telecommunications services provider, Omantel, there was general consensus among the study participants that Oman lacks the required telecommunications infrastructure to facilitate a move into the digital world. The general belief among participants was that the current technologies available in both the government and private sectors in Oman are not ready to launch e-government. In the ICT sector, Oman has employed specific indicators to measure the extent and depth of expanding information technology and communications throughout society – such as the spread of the Internet, the proliferation of IT companies and the adoption of personal computers, fixed and mobile phones – all of which show the growth of these technologies in Oman in recent years. Most government organisations in Oman have already launched Internet sites; there are high numbers of mobile phones in addition to fixed-line telephony; and the spread of personal computers (in the Muscat area specifically) has been significant (in contrast to some more remote areas of the country).

Currently the numbers of highly skilled staff within the public sector in Oman are relatively low. Advanced technologies and complex systems integration are not widely deployed. While there are many capable staff who has made substantial achievements, such resources are in no way sufficient to support the implementation of the proposed strategy – at least for several years.

Gartner Consultancy Group (Information Technology Authority - Oman, 2007) stress that the introduction of the Ubar Portal, the government-wide network, the Government Nervous System (GNS) and integration middleware which pulls everything together, will amount to a significantly different and more complex environment than exists today within government entities. There will also be a much

higher volume of electronic transactions, which in turn will introduce a whole new set of demands in relation to processing speed, resilience, security and confidentiality, business continuity capabilities and capacity to meet demand. Again, these demands will be well beyond what the existing internal resources have been used to managing. It was suggested by some interviewees from Muscat Municipality that government officials and decision-makers should develop a clear understanding of the challenges facing e-government projects in the future, in terms of required IT infrastructure, integration and re-engineering strategies for the implementation of e-government projects. According to a highly-ranked government official, '... the e-government projects in Oman were meant to transform the government and the country as [a] whole [in]to an information society and this promising initiative aims at transforming the public sector's business processes and services [into] better and more easy-to-use e-services'.

The establishment and implementation of a National Convergent Government Network was seen as a necessary step towards the successful implementation of e-government (Al-Ruzaiqi, 2006). Traditionally, government organisations have operated as separate islands whereby each public-sector organisation developed a computerised system different from the others. As a result of the new government convergent network and with the establishment of e-government, public organisations will be able to interact in a meaningful way. This network will employ state-of-the-art technologies to deliver a reliable and efficient service. It is estimated that over 415 sites of different ministries will be connected to the CGN over the next four years. The project also involves the renovation of existing connectivity with modern Multi-Protocol Label Switching (MPLS) technology.

Being the leading telecom company and the main mover of digital and technological culture in the Sultanate, Omantel has been doing its best to enable every house in villages, towns and cities to enjoy digital culture within the framework of the digital society and the objective of e-government.

As a step towards speeding up the implementation of various digital initiatives in Oman, the government invested 6.5 million Omani Riyals to procure licenses for Microsoft desktop products in 22,500 desktops across various Omani Government organisations (Alwatan, 2007). Furthermore, it is anticipated that this will encourage a higher level of technology use within the government sector and demonstrates Oman's keen interest in protecting intellectual property rights in line with to global

standards. The agreement will support the Digital Oman initiative by accelerating the use of new technologies in the government sector, by providing the required products as well as training in their use. The project will expedite the implementation of knowledge-based projects at a national level, for which Microsoft has committed to reinvest funds and support the e-Oman initiative. In addition, this will build capacity within the community to create a knowledgeable society through the concept of knowledge houses, wherein all members of the community will have access to modern technologies and be encouraged to engage in self-paced learning about information and communication technologies.

The first-phase implementation of the e-government services portal (Ubar Portal) in late 2006 was seen as a positive initiative to promote and speed up e-services projects. The Ubar Portal is intended to become the citizen's main entry point for accessing government information and services online, whether provided directly via the portal or indirectly via other government portals, websites and/or applications. Study participants expected the use of the portal to increase the use of e-services, as they are easy to use. The Ubar Portal is planned to be linked to the e-Payment Gateway, to facilitate making payments through a single unified portal (*Times of Oman*, 2007) . It is planned to include e-government services to be used mainly to authenticate, authorise, personalise and redirect service requests to backend systems.

Additionally, the new e-Payment Gateway, launched at the end of 2006, was seen an essential element and one of the major pillars of the government's e-services and e-commerce. Specifically, Oman launched the national e-Payment Gateway to provide an e-governance infrastructure and full e-commerce facilities that allow secure online payments (e-payments). The e-Payment Gateway will enable efficient electronic transactions in Oman, simplifying the processing of payment transactions for electronic services within the country.

As pointed out by some research subjects, the e-Payment Gateway is a key enabler of the successful delivery of public-sector services online. The presence of such a robust and secure e-Payment Gateway would enable shared e-government services to be paid for electronically using major local and international credit or debit cards and, in future, other electronic payment instruments. The study results stressed the critical role of creating awareness among public-sector employees and supporting them in gaining useful ICT skills. As an effort to promote the IT knowledge base in Oman, the government launched the Government Digital Literacy Training Pilot

project in major cities in March 2006, as part of a digital literacy training pilot for 400 civil service employees to provide IT training opportunities to government and community members in order to build IT literacy amongst Omani citizens and equip them with the required skills to sustain a knowledge-based society.

In the second quarter of 2006 the implementation of an educational portal by the Ministry of Education in Oman, the largest e-government project to date, was seen as a positive step towards establishing a major electronic education gateway in Oman. The project aims to provide various services for school management and electronic services to parents through a Ministry gateway. 'The project includes the school management systems SMS and two other essential components: e-learning, the educational portal and online Internet Portal System, which achieves networking among students, teachers, district administrations and all those involved in the educational process' (Information Technology Authority - Oman, 2007).

6.2.7 IT champions

The study results indicated a need to identify key agencies and champions in government that will take the lead in spearheading, developing and implementing e-government projects. A committed and dedicated leader in a senior management position is crucial to initiating and sustaining an e-government project. Someone from this level of management is necessary because this individual must have sufficient authority to make a decision – or to overturn one, if necessary. If there are conflicts in an e-government project that require cross-jurisdictional, cross-department coordination, only someone at senior management level is able to settle these issues. Finally, if there is resistance to the changes arising from e-government, then only someone at a high enough level of management is able to motivate, encourage and, if necessary, compel other workers to adjust and adapt to the changing environment.

E-government initiatives need a strong champion who can drive and promote a project towards successful implementation (Chircu and Lee, 2005). Therefore, public-sector organisations should nominate and empower a person to lead this change process within the organisation. The literature survey revealed that the currently successful projects had a dedicated change person appointed at a very early stage. This change agent should be a person with knowledge and experience of the means to overcome any resistance that might arise during a project's implementation.

According to (Jawad and Reeves, 1997), the presence of an IT champion is one of the factors governing the successful acquisition of IT systems in public organisations in Oman.

6.2.8 Government policy

This research illustrated a significant relationship between government policy and the success of e-government projects. That is demonstrated by the importance of national government plans and strategies in introducing the Digital Oman vision with all its associated initiatives. Thus the results are consistent with other studies (Hinnant, 2002), which reported the positive impact of government policy on a high acceptance and implementation of e-government services. There are, however, some issues related to government policies that need to be addressed, including lack of clear measurement tools and the complexity of technological development.

The study identified, not surprisingly, that a lack of qualified and skilled executives in the public organisations could lead to a low level of commitment to buying into technological projects – the opposite of the situation in the private sector. That could be linked to the fast growth of technological solutions in the private sector, whereas public servants lack that pace of development.

The country should develop policies consistent with the requirements of the new era, mechanisms and technical means for following up the implementation of those policies, and oversee the progress of work in government departments in order to ensure they are meeting their responsibilities and achieving the highest possible efficiency in the conduct of government business (Al-Ruzaiqi, 2003).

The introduction of the centralised gateway (Ubar Portal) for the purpose of offering electronic services from various government organisations was seen as a way for the public to access government services electronically. Several flagship e-service projects are planned to be integrated through this common e-government gateway. In addition, the e-Payment Gateway project will enable citizens to make payments online through multiple payment instruments and thus take Oman to a higher level of e-services and e-commerce.

It seems that government policies and strategies will have a great impact on the future success of technological projects in public-sector organisations. Implementing IT initiatives to deliver e-services such as the National Statistics Online

project, e-Tendering, One-Stop Shop, Education Portal and the National Registration System for Civilians is expected to reflect a significant positive relationship to the success of e-government projects in Oman. Most of these e-service projects are under way successfully; One-Stop Shop, for example, is a major e-service involving six ministries and enables a single-window service for the electronic commercial registration of new companies. In this quick-win project of the government-to-business (G2B) sector, phase one is successfully operational and the project is currently advancing to its second phase.

6.2.9 Legal issues

Oman's electronic transactions legislation concerning protection of privacy, the validation of digital signatures and electronic-message regulations is expected to be enacted by the relevant authorities during 2007. It is noticeable that the focus has been on the technical aspects and economic costs of implementing e-government projects, without going through the administrative reorganisation or the political and legal means to do so. In spite of the importance of those technical aspects, the biggest challenge lies in the management bureaucracy.

One of the main challenges in setting up e-government services is to gain the confidence of users by offering guarantees of information protection (Heeks, 2003d). The research results indicated that security concerns were one reason for low adoption rates of e-government projects in public-sector organisations. The users must be convinced their personal data is handled confidentially and that online transactions are safe. Another challenge is the legal validation of electronic transactions (eg. e-documents, e-forms or use of e-signatures), as well as legal electronic means of payment.

The general understanding gained from this study is that to develop sustainable e-government initiatives, the government of Oman must pay particular attention to legal and political considerations. There is a need for strong legislation that governs and protects users' personal data. Legal frameworks have been completed for legislation to govern the factors critical to the completion and dissemination of electronic government; however, until the legal formulas are in place the effectiveness of e-government is compromised. Hence there is a pressing demand for appropriate legislation to be enacted which will organise the work of specialised

electronic government. Even with such legislation in place, however, Oman lacks suitable training for judges and lawyers which would provide them with the judicial knowledge and technical understanding of the complexities involved in dealing with digital issues.

It is expected that users of e-government services will not go online if they do not trust this new method of dealing with government organisations. Guaranteed privacy and the security of authorisation and e-payments must be provided. Therefore, public-sector organisations should ensure that open communication between inter-government organisations does not create a threat to the privacy of users' data. Online verification of identity must also be as secure as current physical verification. Furthermore, users of e-government services need to be assured of the reliability and security of the e-payment system.

Security generally refers to the protection of information system assets and control of access to information. Security policies and strategies are context- and information-specific. Privacy refers to the right for information attributed to an individual to be treated with an appropriate level of protection. Information privacy protection laws are often put in place to regulate this issue. Protecting the privacy of citizens and assuring them that their personal information will not be compromised is critical in e-government because it constitutes the key to user trust. Without this assurance, no-one will be prompted to use e-government services. Fearing that the privacy of their citizens may be at risk, some local municipalities are refusing to connect to the system.

6.2.10 Publicity and awareness

The e-Oman Awareness road show, launched in April 2006 by the Information Technology Authority, aims to inform the public of the e-Oman initiatives and provide an update on the status of various e-government projects undertaken by ITA The research results illustrated that awareness campaigns are essential factors in the success of e-government projects. Study participants saw it as necessary to publicise e-government projects to inform the stakeholders, in order to increase the adoption rate. All means of media could be used to deliver the benefits of these e-service projects. Successful pilot projects must have a wide audience and affect a large

number of citizens and government units, such as the One-Stop Shop pilot project of the Ministry of Commerce and Industry (discussed in chapter 4).

Issues of awareness and skills have to be addressed through a change management initiative. Basically, government employees and end-users need to be aware of an e-government program, its objectives and how it will affect them. In addition, IT and skill capabilities have to be built into administering the new way of working with e-services (Al-Shihi, 2006). Therefore, it is recommended that public-sector organisations develop a change management strategy that addresses the fear of change and technology, and encourages public-sector employees to buy into e-government projects. Public-sector organisations also need to ensure that government employees are able to use the various web-based technology projects.

In addition, publicity strategies seem to be positively related to the success of e-government. Government institutional frameworks are very important in shaping organisational characteristics and web management practices. For instance, having all the IT employees as members of the state civil service seems to be negatively related to e-government success. This may be an indication of the degree of managerial flexibility and may show that more flexibility could lead to better results. Similarly, having executive support and legislative involvement appears to be positively related to e-government success. Finally, political, demographic and economic factors can shape both organisational characteristics and institutional arrangements. Public managers should be aware of these indirect effects on successful e-government and take them into consideration when making IT investment and implementation decisions.

It is widely expected that higher levels of perceived relative advantage will increase the intention of citizens and the private sector to use e-government services. Therefore, public-sector organisations should identify and communicate to citizens the advantages of using online services, as opposed to other means of retrieving information and completing transactions with government organisations.

6.2.11 External influence

As the research results indicated, there is tremendous external pressure on public organisations from both the public and the media to embark on e-services initiatives. There are several possible explanations for this. One could be that the evolution of e-

government projects in other GCC countries, especially Dubai, has put extra pressure on public organisations in Oman. Also, the unexpected failure of e-government projects worldwide, not just in the Arab world, has made the media very critical in judging the success of e-government projects.

The current research found that there are many reasons for developing partnerships with the private sector in developing e-government projects. First, there is the possibility of cost-sharing projects, with a possible return on investment for the private sector. Second, the private sector has invaluable expertise that can be tapped by government in the areas of customer satisfaction, work productivity gains and personnel efficiency. Third is the possibility of technology transfer from the private to the public sector. Public-private partnerships can be productive for e-procurement, e-payment and information technology. It is evident that the private sector can offer valuable expertise in specialised areas and that cooperation between the public and private sectors could reduce the upfront cost in return for revenue sharing. It is recommended that government officials partner with private-sector organisations to tap their IT capability. Private-sector involvement could thus be of great assistance in offering public-sector services online.

Cooperation with the private sector can facilitate effective e-government nd the government can encourage private-sector investment by complementing and supporting private-sector efforts. The key to e-government is to improve citizen access to service delivery, not further expand the role of government. Government should not attempt to create products and services which public-private partnerships or private service providers can adequately provide more efficiently and effectively.

The implementation of e-government requires cooperation with the private sector, as well as with citizens. A project such as an e-government project requires that the entire community is involved so that the government, the business sector and non-governmental institutions cooperate actively to produce successful outcomes. The private sector can assist with the provision of advisory services, development work and appropriate technical solutions to achieve the objectives of e-government. In developed countries, the private sector has played an important role in the development of e-government services through its contribution to the provision of basic materials of hardware and software.

In Oman, by contrast, the evidence suggests a lack of coordination and cooperation between public-sector organisations in acquiring ICT applications,

pointing out that many of them have established structures and applications different from each other. Government officials and the private company partnerships that assist them must be aware of the role of the proposed variables and their antecedents in the online environment; they must take into account the prospective outcomes of this research in their organisational plans.

There are necessary conditions and requirements for creating administrative change to accommodate new technology such as e-government initiatives (Moon and Norris, 2005b). The need is to develop a strategy for the administrative development of standards and levels of performance which are defined rigorously, applied firmly and committed to over time – rather than strategies to adorn the shelves of senior management, or the offices of the mass media, for consumption or submission on national occasions. Public organisations need to conduct administrative reviews and encourage private-sector investment to expedite the adoption of electronic services, as well as to close the technical gap in public-sector organisations. 'The challenge we face now is the transition from a bureaucratic model to a model adapted to reality and a global, digital economy based on information and social changes', according to one government official.

6.3 Chapter summary

The success of e-government requires fundamental changes to the way government works and how people view the ways in which government helps them.

Critical to the success of the transformation to e-government is the understanding that e-government is about the creation of new processes and new relationships between governed and governor. E-government requires strong political leadership in order to succeed, because strong leadership can ensure the long-term commitment of resources and expertise, and the cooperation of disparate factions. Governments will have to explore new relationships among government agencies as well as partnerships with the private sector to ensure the quality and accessibility of e-government.

The success of e-government initiatives depends on engaged citizens and efforts to foster the civil community's engagement. In order to develop this citizen-focused vision, policy-makers must keep the ordinary citizen in mind when designing systems. In addition, the growing political interest in e-government arouses great

hopes. If the promise of e-government as the key principle for modernising government services is to be kept, this concept must include the full potential of flexibility offered by information technology as well as the complex reality of government and public governance.

Political encouragement and support for e-government should be accompanied by an integrated approach to overcoming implementation problems in order to develop successful e-government projects. It is acknowledged that the culture of society, the proportion of illiteracy to education, awareness of the Internet and the availability of skilled professionals constitute the most important factors in the success of e-government.

Chapter seven will present optimum practices and processes arrived at as a result of this research to develop successful e-government initiatives. The required skills and strategies for the deployment of e-government initiatives will be outlined in that chapter.

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7 DEVELOPMENT STRATEGIES

This chapter presents the strategies and support mechanisms that public-sector organisations should have in place, in order to encourage the successful development of e-government initiatives in Oman. Top management support, IT capability, IT champions, learning from developed countries, effective awareness campaigns, external influence and legal and policy issues are the key factors for the development of e-government initiatives. The chapter also offers suggestions for government officials and decision-makers to improve the development of e-government projects.

In light of the availability of the Internet and the development of information and communications networks, new concepts such as distance education, e-commerce, and e-government have emerged. E-government is intended to implement a new method of working in order to improve the relationship between government organisations and citizens through electronic means.

7.1 Requirements for successful e-government

Successful e-government projects not only attract those citizens who are already connected to the Internet but also they must be able to move people online who are not already there. According to the E-Services Workshop (Information Technology Authority - Oman, 2006a), readiness factors for e-services in Oman were found to be that there is clear demand for the service, users are capable of using it, there are incentives in place for using it, back-end business processes are in place, systems integration has been implemented, security and privacy issues have been addressed and publicised, system performance has been tested and found to be adequate, potential legal problems have been addressed, post-launch support facilities including escalation processes are in place, a service owner has been assigned, community of interest requirements have been addressed and failsafe measures are in place.

Along the same lines, the Oman government experience reveals several factors that could help in the implementation of e-government initiatives (Information Technology Authority - Oman, 2006a). First, senior management should provide the essential focus, direction and leadership to ensure the participation of other government employees in achieving government objectives. Second, the availability of ICT personnel and the recruitment, training, re-training and retention of ICT professionals are critical to the success of any e-government strategy. Compensation mechanisms are also required to support the recruitment and retention of top-level ICT professionals. Third, the implementation of e-government involves new ways of doing the same jobs and processes being re-engineered. Fourth, enabling legislation is required to achieve the objectives defined in the e-government strategy. These objectives include legislation to support and enable electronic transactions, the use of electronic signatures and authentication, as well as legislation to deal with computer security and cyber-crime. Last, the existence of a methodology to monitor and assess progress towards the goals defined in the e-government strategy and for evaluating strategy implementation needs to be articulated, developed, discussed and approved.

Generally speaking, strategies for a society's successful transition to e-government aim to bring about a shift in the way government interact with citizens and business (Heeks, 2003d). The need is to develop a cohesive strategy beginning with a study of the development of governmental administration systems and proceeding to the rationalisation of resources, creation of a legal environment and

strengthening of the capacity of citizens to use informatics and the benefits of advanced technology.

7.2 The move towards e-government

The concept of e-government facilitates formal procedures and overcomes the difficulties facing the citizen dealing with government organisations. E-government seeks to address the strategic aspects of a society's economic, social and political aims by developing government services accessible by all citizens. In addition, e-government aims to reduce the costs of government operations and their associated administrative services, as well as to increase the efficiency of government organisations in their dealings with citizens and companies. It also aims to provide multiple services and comprehensive information to individuals and institutions. Overall, there are several objectives in moving towards e-government projects which can be summarised as follows:

- Demonstrate a high level of transparency and strong commitment to the publication and circulation of information and services.
- Provide necessary information and services for the public to find new ways of improving services and relations between government and citizens.
- Improve government performance through saving money, time and resources expended.
- Improve services in the light of criteria based on high quality.
- Facilitate the delivery of services to the private sector and individuals.

The benefits expected from the introduction of e-government projects include upgrading the efficiency and effectiveness of processes and procedures within the government sector, facilitating and accelerating the delivery of services whereby the public will be able to complete all transactions with government organisations electronically (Moon and Norris, 2005b). These benefits in turn lead to developing the quality of services, reducing the incidence of errors, increasing the speed of response and simplifying procedures, all of which will reduce costs and increase the demand for jobs and services required by the new system. This last factor will help to attract more skills and experience to public organisations, in addition to attracting the cooperation of companies operating in the field of advanced technology.

To ensure the success of e-government, public-sector organisations in Oman must put in place a realistic strategy for implementing a management development program, the continued development of relevant legislation, plans for redesigning of the work processes and personnel training. Together these strategies form a plan for the development of an administrative culture consistent with the concept of e-government and a program to develop creativity in the intensive use of information technology.

The word 'e-government' signifies not only technology and services; it represents a new relationship between citizen and the government based on transparency and mutual trust. It also implies a willingness to create better public-sector organisations and a desire to lead citizens towards acceptance of a new culture. It is worth mentioning that Oman started planning for the introduction and implementation of e-government projects several years ago (National Committee for Information Technology, 2003), when a National Information Technology Committee for e-government started preparing the infrastructure and developing clear, essential strategic criteria.

The primary purpose of e-government is to facilitate and simplify procedures and reduce paperwork, red tape and bureaucracy through the use of ICT applications. The strategies for a successful shift to e-government initiatives include the following:

7.2.1 Reform of administrative processes

The reform of administrative processes is the first step in the process of transition towards successful e-government. The reform process underlies the creation of new processes and procedures leading to changes in administrative methods, particularly as they affect the relations of public-sector organisations with citizens and businesses (Peristeras et al., 2002). The success of e-government projects requires a re-engineering of the administrative procedures currently in use; it relies on obtaining the full support of the highest official in each organisation, to ensure the cooperation of all public-sector organisations towards a common purpose. There is a great need to cooperate with companies that are technically capable of implementing e-government services and providing acceptable solutions for public-sector organisations. In addition, there is a need to formulate acceptable standards for the implementation of

e-government projects and adherence to the timetable for each project, with an emphasis on the importance of training and educating the public as to the benefits of e-services.

The use of ICT is not simply a tool to improve revenue and achieve cost savings (Heeks, 2003c). E-government projects are essential to the reform of existing processes and procedures that will enhance the performance of public-sector organisations in terms of services provided to users. Government e-services require extensive efforts from government organisations to ensure their successful delivery with measurable value and effective customer usage. The introduction of government e-services will mandate significant changes to the government's business, technology resources and organisational structures.

7.2.2 Clear vision and strategy

A shift to e-government requires a broad vision to achieve the expectation and benefits of that shift. The vision encompasses long-term plans for meeting the broad objectives of e-government, through providing general guidance for organisational change in a consistent and coherent manner, allowing staff members to gain understanding of the new methods with a positive attitude. The vision should include a broader perspective and take into account the developmental needs and opportunities at the national as well as local level. The vision of e-government must be part of a broad framework of making available technical information for the benefit of the economy and society as a whole (Moon and Norris, 2005a).

The shift towards e-government requires a vision: a clear message and precise priorities in the light of criteria and specifications defined in line with and corresponding to recent developments in ICT. The strategic investment should include the availability of clear investment plans and specific objectives associated with the timely availability of human and material resources. In that regard, e-government projects should be chosen on the basis of achieving maximum returns in terms of investment and the optimal use of human and material resources. From this standpoint, there is a need for qualitative and quantifiable criteria to measure productivity and performance quality.

The success of e-government requires a great deal of change in the working methods of government organisations and their relations with citizens. There is no

single strategy suitable for all cases and circumstances, but any strategy should be detailed on the basis of the needs and concerns of recipients of the service and the circumstances and conditions in which they live (Prattipati, 2003). This can be pursued efficiently and effectively through the development of an e-government model based on the needs and demands of citizens and businesses. The key to e-government is to improve citizen access to service delivery, not further expand the role of government.

In order to accelerate the process of e-government readiness, public-sector organisations should formulate detailed plans aimed at executing their ICT policies and strategies, and undertake new initiatives that will raise IT literacy levels among the public (OECD, 1998). In addition, awareness must be created among the general public of the importance of IT and the purchase of a home computer and Internet connection should be facilitated or subsidised for those who find the cost prohibitive. By preparing a comprehensive infrastructure for IT literacy, with particular emphasis on the services provided by critical sectors such as health, education and employment, governments can lay a strong foundation for the greater penetration of e-government services throughout society.

There should be a task force set up within each government organisation, in charge of implementing plans for the transition process in accordance with the general objectives. In addition, each working group should develop a plan to gather information leading to the reorganisation and redistribution of manual labour, streamlining procedures and verifying that they operate efficiently before mechanisation. That task force should focus on the implementation of transition processes for user participation and the removal of any kind of suspicion, fear and resistance to change that accompanies such projects. Furthermore, there should be direct communication between team members and government officials to ensure their interaction and participation. The task force should develop proposals to implement many of the training programs and foster awareness of the importance of transformation. Moreover, there should be a focus on services that touch people's needs so as to ensure their involvement in future phases of the project.

7.2.3 Strong leadership

Senior management support is a key ingredient for the successful development of e-government projects. This support is critical in overcoming an initial resistance to the new learning required for the operation of e-government services (Carter and Belanger, 2005). Decision-makers within public organisations should recognise the importance of outsourcing and, as a result, provide new projects with continual leadership and support. Senior management support should also be in place to secure the resources needed to implement an outsourcing project. Management should facilitate communication and collaboration between different government organisations towards common goals. Strong leadership involves gathering support for projects at all levels of government, as well as involving citizens, in order to achieve cooperation between government organisations to meet their operational requirements.

Strong leadership is essential to the successful development of e-government projects in terms of the guaranteed long-term commitment of financial resources, manpower and expertise in project design, development and implementation (Hinnant, 2002). A successful shift to e-government requires officials at all levels to absorb technological implications and policy objectives, thereby developing in them a motivation to work through the various stages of reform.

Without the availability of qualified and skilled manpower to deal with e-government initiatives, it would be difficult if not impossible to achieve the objectives of setting up e-government. Therefore, e-government projects require political leadership and strong management committed to public support of the required shift. This requires the provision of time, effort, money, resources, the political and economic climate, social and technological assistance, all of which contribute to the development of creative manpower capabilities.

Also, emphasis must be placed on the careful selection of managerial leadership entrusted with the transformation process; such people should possess strong leadership qualities in terms of the ability to convince officials of a project's need for material and human resources. In addition to communication skills, the work of establishing an e-government project requires extensive coordination between its members from various government organisations. Therefore, successful management is the most important factor in the success of e-government, followed by technical support and enthusiasm among government-sector employees.

In general, e-government project development requires strong political leadership in order to succeed, as that support can ensure the long-term commitment of resources and expertise as well as the cooperation of employees.

7.2.4 Legal framework

Another important factor in the success of e-government is the presence of an adequate legislative framework. Legal reform is one of the most critical inputs to the development of e-government projects and should encompass the use of information and communication technology to deliver government services to citizens. Therefore, government organisations should ensure that changes in the legislature to protect e-government information and privacy in the digital age are effected before e-government projects are implemented. Laws and regulations need to provide the desired level of protection - for e-government and e-commerce in general. Without the presence of executive leadership and adequate support this task may be impossible.

Legal reform is an issue that has not received adequate consideration and examination in Oman (as well as GCC countries in general) (AlShawaf and Khalfan, 2004). However, experience has shown its importance to the success of e-government in terms of its ability to continue to perform its functions. Therefore, the government should develop a range of electronic regulatory measures designed to address information-sharing within public organisations. The potential for unreasonable exploitation of this information by a third party, in particular from the private sector, is a threat that must be met by strong legislative measures. These must secure privacy and provide security; empower the digital exchange of information and transactions between government, citizens and the business sector; recognise the digital exchange of information and allow electronic transactions and record-keeping; and enable citizens to gain easy access to government, information and communication services.

It is known that governments collect vast quantities of data about their citizens and protecting the privacy of citizens' personal information is an important issue. Therefore, public-sector management needs to educate and train government officials in the importance of privacy, designing applications that integrate privacy protection and limit access to personally identifiable information. Without trust, citizens who

may already be doubtful about using new technological services may avoid the use of online services that ask for detailed personal information.

7.2.5 Infrastructure development

The most important prerequisites for building e-government are the provision of appropriate telecommunications infrastructure, the presence of appropriate legislation and regulations, readily available information about how to conduct government transactions, the provision of adequate information security and the building of human and material capacity. Public-sector organisations need to create infrastructures for successful e-government by employing effective communication systems for data transfer and the flow of information between government organisations and the public.

There must be adequate telecommunications infrastructure to ensure the success of e-government projects – often called 'the backbone'. Oman is currently making great strides to improve and develop infrastructure in this area through the implementation of the Government Convergent Network, which will link all government organisations (Al-Ruzaiqi, 2006). Although the tools required to support government operations vary from case to case, the infrastructures for e-government are generally consistent and include structured network components, security components, etc. Since e-government operations will serve citizens, its success depends on citizens and hence it is important to make efforts to stimulate their interest. Some public-sector organisations in Oman already have a sound IT infrastructure that can allow them to contact various regional offices; others, however, still lack such infrastructure and networks (Alwatan, 2005).

One of the most important indicators for building e-government is the global trend towards liberalisation of the telecommunications sector (deregulation) and increased competition among telecommunications companies and service providers (Internet, fixed line and mobile phones), which has led to a decline in prices. In addition to the development of e-commerce systems and digital signatures, the world has witnessed considerable expansion in the online delivery of government services and the provision of banking services. Public-sector organisations need to carefully select e-government projects; projects which are compatible with the nation's telecommunication infrastructure, as well as introducing telecom competition and

lifting regulations on wireless and other digital technologies to accelerate their deployment. The preliminary success of these projects could become the starting point for promoting all future efforts and create a political willingness to support the progress of e-government. Any small success story can become a powerful example to be imitated by others. In order to build IT capacity, public-sector organisations also need to learn about and cooperate with private-sector companies (Reffat, 2003).

To obtain the benefits of investing in information and communication technologies, public-sector organisations need to work positively on transforming themselves from inside. The IT network is becoming very relevant to the business world and it is the platform that will enable this transformation. Technology is an enabler and, when coupled with new methods of operation, can provide fundamental improvements in public-sector efficiency, speed of service delivery and citizen satisfaction. Government organisations should aim to adopt best practice and align their business objectives with the latest technology, in order to provide citizens with easy and accessible government services.

7.2.6 Resistance to change

It is to be expected that public-sector employees may resist the concept of e-government. The problem is very sensitive in developing countries in particular such as Oman, as they have fewer skilled human resources and other employment opportunities are less available than in the developed world. That resistance may rise from many factors including:

- fear that technology will replace them and they will become jobless
- fear of losing power, influence and authority in the current system
- fear of being stigmatised by showing hesitation and ignorance in front of others when unfamiliar with new technology
- fear that technology will mean more work for them, as in the case of answering e-mails constantly
- belief that they will not obtain the advantages of the professional application of new technology.

According to research conducted by the Dubai School of Government (Salem, 2007), the common challenges facing e-government developers in the Arab countries

can be categorised into several areas including capacity building, the digital divide, technical infrastructure and funding institutional frameworks. A large proportion of civil service employees in Arab countries, including Oman, lack the knowledge required for successful e-government adoption at a national level. Despite a broad realisation of the importance of capacity building in the public sector, resistance to change is a common problem that hinders such efforts.

As the first step to overcoming this issue, public-sector officials must understand the issue and identify the reasons behind employees' resistance to change. Thereafter, public-sector senior management might launch change campaigns and outreach programs, commentary, training, evaluation, reward and recognition. In addition, the media can play a major role in educating members of society through conferences or symposiums, because even today there are many citizens who have not come to grips with how to handle technology applications. Basically, the media should be employed to inform people about the available e-government services and the benefits to be expected from them, as well as to raise people's confidence levels concerning electronic means of dealing with government. As it is to be expected that electronic information security will be one of the greatest challenges facing public-sector organisations, governments should provide assurances which directly address security and privacy concerns.

The research findings suggest that e-government policy-makers must consider a citizen-centered approach rather than an organisational approach. That is to say, e-government should be an end-user or demand-driven service. It might happen that citizens do not use e-government for several reasons, among these being unfamiliarity with ICT, lack of access, lack of training, and concerns about privacy and security of information. While e-government may provide ease and convenient delivery of public services as well as innovative government services, none of these benefits will prompt citizen to use services with which they are unfamiliar or do not trust. It is therefore imperative that public-sector decision-makers address the public's security and privacy concerns (Ho and Ni, 2004).

An e-government project cannot be considered a success unless it achieves a usage level that would indicate a certain degree of acceptance by citizens has been reached. In general, increasing public awareness and trust of e-services and changing public perceptions of the value of e-government is a key issue for the spread and acceptance of e-government services.

In addition, awareness strategies seem to be positively related to the success of e-government projects. Part of any organisation's resistance to change may be attributed to lack of information and incomplete understanding of issues or of the changes that are taking place (Ho and Ni, 2004). It could also arise from unfamiliarity with and fear of technology. Thus, it is important to help members of the organisation understand the aims and the benefits of new projects. Government officials and decision-makers must endeavour to explain changes, involve employees by soliciting their input, identify the pockets of resistance within their organisations and devise plans to overcome them.

7.2.7 Public–private cooperation

There are many reasons for developing cooperation with the private sector in developing e-government projects. Among these is the possibility of forming cost-sharing partnerships, with a possible return on investment for the private sector. Furthermore, the private sector has valuable expertise that can be tapped by government in the areas of customer satisfaction, work productivity gains and personnel efficiency. There is an advantage to be gained by technology transfer from the private to the public sector, as the private sector is technologically more advanced compared to public-sector organisations (in Oman at least).

The private sector plays an important role in e-government services through its contribution to the provision of technical expertise to assist projects. The private sector can serve e-government through advisory services and developmental work to provide appropriate technical solutions to achieve the objectives of e-government (AlShawaf and Khalfan, 2004). Usually, the private sector has considerable technical expertise that could be wisely utilised in all phases of an e-government project. In the planning phase, there should be advisory task force from the public and private sectors to determine the objectives and anticipated opportunities. There is a need for active participation from private-sector advisers and following the initial study their views will prove useful in the early stages of a project. It is recommended that the private sector should play an active role in the transformation process.

The development of e-government projects can not be done by government organisations alone. The private sector can take a key role in the stages of defining the vision, planning and even implementation, review and evaluation. On this basis,

public-sector organisations must learn to deal with the private sector as a full partner. This implies a recognition that the contribution of all stakeholders is needed in establishing e-government; it also involves creating business models and realistic e-government projects, finding the strengths of each partner and determining the contributions required both domestically and externally.

E-government aims to serve citizens, businesses and community organisations; its proponents must therefore cooperate and should participate in building and establishing mutual relations and alliances that benefit the community as a whole. Cooperation is not limited to the relationship with citizens, businesses and community organisations, however, but should also include relationships with interested government and non-government organisations and all other government stakeholders at every level. There must be cooperation between public-sector organisations and private enterprises dealing with e-government projects, and this cooperation is not limited to electronic transactions but also includes the exchange of views, ideas and investments.

It is widely acknowledged that the shift to e-government must involve all stakeholders and that it is necessary to provide a high level of coordination and cooperation between public-sector organisations and the private sector (whose active participation can make available the necessary access to quality and efficiency) (Al-Balushi, 2003). Government should not attempt to create products and services where public–private partnerships or private service providers can adequately provide these products and services more efficiently and effectively.

7.2.8 Learning from experience

Readiness for e-government in the Gulf region has been ranked at approximately 50 per cent by an index compiled in a report by the United Nations Department of Economic & Social Affairs (UNPAN, 2005), compared with 91 percent for index leader, the United States of America. The report entitled 'Global E-government Readiness Report 2005: From e-government to e-inclusion' ranked Oman at number 112 in the world in terms of e-government readiness. According to the report, e-governance readiness is determined not just by government initiatives aimed at making comprehensive government services available online to citizens, but also by the level of acceptance of (and participation in) e-services. Therefore, assessing the

current and future IT literacy needs of Omani society and establishing mechanisms aimed at monitoring the progress of IT literacy is a key to e-government readiness and is essential to the acceptance of e-government services by the general population.

Undoubtedly, the development and growth of e-government projects in Oman will happen sooner or later, and the experience of the pioneering Dubai government-commerce in this area indicates the beginning of such projects in the region (AlShaer, 2003). Oman's public-sector organisations need to increase their efforts for close collaboration with international organisations such as the UN-ESCWA, WSIS and others. This type of association and learning from experience of e-government can help Oman's public-sector organisations to shorten the time needed to achieve a more advanced level of IT and e-services knowledge and close the digital divide. Also, government organisations in Oman should adopt best practice and align their business objectives with technology in order to provide citizens with citizen-centric government services. Depending on the e-readiness of the government organisations, appropriate channels for service delivery need to be selected (e.g. Internet, ATMs, mobile phones, kiosks in public places). In the rapidly developing e-government field, a culture of learning from failure should be promoted instead of the face-saving efforts that commonly prevail.

There are several suggestions for public organisation management to be derived from this research. It is clear from the research results that technological factors by themselves are not the solution to delivering successful e-government projects (UNPAN, 2005). It is evident that a holistic approach of thinking about organisational factors, perceived technological aspects of e-government and the environmental influences at work is the optimal strategy. In addition to the importance of skilled manpower resources, organisational IT capabilities are important determinants of e-government success (Heeks, 2003a). Governments have rules and procedures to follow in conducting an outsourcing project and it is recommended that government organisations partner with the private sector to tap its IT capability, as private-sector involvement will offer technical solutions to the public sector for providing online service.

Lastly, public-sector officials should include civil service employees in order to give them a measure of ownership of the process. In fact, it is important to seek their input: that in return will motivate them and make them key instruments in selling the idea of e-government to other members of their organisations.

7.2.9 Skills for successful e-government

Every e-government project requires five groups of skills to achieve a successful implementation process (LaVigne, 2001). These are analytical skills, information management skills, technical skills, communication and presentation skills and project management skills. All are essential for the activation of any e-government project and to enable it to provide the necessary services efficiently and effectively. As such, they represent the advanced skills which must be required of public sector employees. These skills must be included in the strategic development of human resources needed for successful e-government implementation.

Among the required technical skills are the design and implementation of information systems compatible with existing infrastructure. The analytical group includes skills of interpretation and analysis – the basic skills that should be available at each stage of an e-government project development. These skills identify problems, describe and analyse the needs and requirements of users, and ways in which the flow of information can be managed (Reffat, 2003).

Information management skills deal with the foundations of knowledge and information through verifying the safety of content, quality of data and levels of compatibility with other data and information. Communication skills focus around the purpose of creating awareness of e-government projects and attracting the necessary support from all stakeholders involved. Central to project management skills is the identification of the impact of ICT used in the structure of work, the impact on services offered to citizens and methods of measuring the performance of e-government projects.

7.3 Chapter summary

This chapter discussed the development strategies for e-government projects. E-government is a process that requires a sustained commitment of political will, resources and engagement among the government, private and public sectors. However, if e-government planners and top management officials take care of technical requirements, they have the potential to develop a system of e-government that not only makes current government practices more efficient but also transform the relationship between the public, private and government sectors.

The success of a society's transformation to e-government also depends on the understanding that e-government projects are about the creation of new processes and new relationships between public organisations, citizens and the business sector. It is recommended that public-sector organisations prioritise projects to maximise available funds in view of tightly limited resources. In addition, public-sector organisations should plan to explore new relationships among other government organisations as well as partnerships with the private sector to ensure the quality and accessibility of e-government. In conclusion, the success of e-government initiatives depends on their acceptance by citizens and society as a whole. In order to develop this vision, policymakers must keep citizens' needs in mind when planning e-government projects.

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8 CONCLUSION

The aim of this chapter is to gather the findings of the previous seven chapters and summarise the research findings and results. The chapter begins by recapitulating the research objectives and research questions; it proceeds to reiterate the literature reviewed, the methodology employed and the research results and findings. In addition, the chapter indicates the research implications, limitations and opportunities for future research.

8.1 Research objectives

The thesis was set to examine the factors that may affect the success of e-government projects in public-sector organisations in Oman. In order to answer the research questions, the relevant literature was reviewed and the research model factors were tested. In summary, the research was conducted to address the following general research question:

- What are the factors that lead to successful development of e-government initiatives in public-sector service organisations?

Despite the wealth of research in the area of e-government, this question has not been widely explored – especially not in developing countries such as Oman. This

study focused on the contextual effects of the perceived characteristics of innovation, organisational and environmental variables that influence public-sector organisations in their development of successful e-government initiatives. Therefore, the study also addressed the following sub-questions:

- Q1: What are the characteristics of e-government, and how do these characteristics influence public sector organisations in developing successful e-government initiatives?
- Q2: What are the organisational characteristics that influence the decisions of public-sector organisations in developing successful e-government initiatives?
- Q3: What are the environmental characteristics that influence the decisions of public-sector organisations in developing successful e-government initiatives?

This thesis was divided into eight chapters. Chapter one described the problem statement, the research objectives and the research questions. Definition of key concepts was provided. Chapter two outlined general factors for the successful acceptance and implementation of Information Systems projects and reviewed the electronic government development literature. Specifically, the research investigated only those factors that contribute to the successful development and acceptance of e-government.

Chapter three presented an overview of the procedures used to conduct the study and discussed the research methodologies used to explore the research objectives. Justifications for the use of a case study methodology to explore the research questions further were also provided. A case study research method was found to be an appropriate method to employ, using both quantitative and qualitative techniques to investigate the factors affecting the successful development of e-government initiatives in public-sector service organisations. The qualitative study gathered data, mainly from semi-structured interviews with government officials, to support the findings of the quantitative data analysis as well as to identify additional variables. The research sample consisted of employees from various public-sector service organisations in Oman.

Chapter four described the case study under investigation including a description of Oman's administrative system, its geographical features, economic and political situation. This chapter also detailed the efforts that have been carried out by the government to introduce ICT projects in Oman in general and within public-sector

organisations in particular. In addition, a more detailed description of current e-Oman society projects and their sub-projects, including e-government initiatives, were reviewed in more detail.

Chapter five began by analysing the data collected using questionnaires distributed to public-sector employees. Data analysis involved compiling demographic information about the respondents, the performance of reliability and validity checks and the testing of relationships between variables. Statistical analysis carried out on the survey data revealed that six factors were found to be statistically significant in the successful development of e-government initiatives.

Chapter six presented a discussion of the results obtained in answer to the research questions. Relative advantage, compatibility, top management support, government policies and other factors appeared to be strong predictors of the successful development of e-government projects.

Chapter seven listed a set of best practice strategies that government officials should employ to ensure the success of e-government projects.

8.2 Research findings

The research model explained 59.9% of the variance in perceptions about the successful development of e-government projects including relative advantage, external influence, top management support, compatibility, political and legal framework, and IT capability. Qualitative data supplemented the results obtained from the questionnaires and also allowed more insight into the development of e-government projects in Oman. The interviewees revealed considerable understanding about the development of e-government projects. Based on the interview data, a list was captured of key factors that were perceived to influence the successful development of e-government projects within Omani public-sector organisations (see Table 22: section 5.4.2).

A number of findings related to the factors that influence the development of e- government initiatives were identified in this study. The research results illustrated that e-government services are likely to succeed if certain key factors are taken into consideration; they included continuous top management support, easy access and low-cost telecommunications services, privacy and security guarantees, and building the organisation's IT capabilities. In addition, the study results showed an agreement

with the expected benefits of adopting e-government services, as respondents believed that e-government can improve the delivery of government services to citizens and the private sector. The above mentioned success factors are applicable to the structure of Omani public sector organisations. Factors such as top management support, government policy and telecommunication infrastructure are directly applicable to the success of e-government projects in Oman.

It was acknowledged that the introduction of e-government raises the level of efficiency and effectiveness within the government sector through facilitating and accelerating the delivery of services. The most interesting finding was the perception that the introduction of e-government projects would help to attract more skills and expertise to public organisations. The general concept of e-government requires a balance between a full implementation of tasks and responsibilities based on the government's information technology strategy, and global trends in the current and future development of public policies.

The results of this study showed that e-government projects would be accepted if they were found to be compatible with the relevant organisation's existing work practices; it was also expected that the more individuals use the Internet, the more likely they are to use e-government services.

It was pointed out that some factors would slow the development of e-government projects and that there should be a movement towards upgrading public-sector organisations throughout Oman. The results showed that e-government projects will be useless if they are not accessible by large numbers of people. This study found that, in general, it is necessary to identify which government services will be made available through e-government projects in order to promote and market them to the target audience. The study highlighted the necessity for public-sector organisations to prioritise the services that will initially be offered online. In addition, government plans should include a range of electronic channels and gateways to provide multiple services, and the joint construction of the electronic structure of government across the various governmental units.

The research results placed emphasis on the role of leadership in the success of e-government because it ensures the long-term commitment of financial resources, personnel and technical expertise in the design, development and implementation of e-government projects. It was evident that leadership support for e-government initiatives is necessary at all levels of government in order to involve the public in the

quest to meet their needs and expectations, and to maintain a sense of urgency to complete e-government projects. Top management support for e-government projects was found to be critical to the success of such projects, particularly in order to overcome any communication and coordination barriers between various government organisations. In addition, the necessary political support and encouragement should be accompanied by an integrated approach to overcoming any implementation problems in order to develop successful e-government projects.

The research results highlighted that government e-services require extensive efforts from government organisations to ensure their successful delivery, with measurable value and effective customer usage. The introduction of government e-services will mandate significant changes to government business, technology, and organisation. The research results illustrated that public-sector organisations must change their way of using technology and should foster cooperation between the private and public sectors to find ways of efficient and effective means of service delivery to the public. As the implementation of e-government requires strong leadership and vision, the successful implementation of e-government must address management and employees' resistance to change.

The general belief among the study participants was that the current IT capabilities available to both the government and private sectors in Oman are not ready to launch e-government on a broad scale. It was suggested by many interviewees that government officials and decision-makers should develop a clear understanding of the challenges facing future e-government projects in terms of the IT infrastructure required, as well as integration and re-engineering strategies for e-government implementation.

This research illustrated a significant relationship between government policy and the success of e-government projects. That is demonstrated by the importance of the national government's plans and strategies to introduce the vision of a Digital Oman with all its associated initiatives. As indicated in the Oman background chapter (chapter four), the national framework is a prerequisite for any e-government project. The survey results also revealed agreement that there is a need for public-sector organisations to develop frameworks for understanding the effectiveness and efficiency of e-government projects. The study findings demonstrated that the ITA is investigating various ways to transform Oman into a sustainable, knowledge-based society by leveraging ICT in order to enhance government services, enrich businesses

and empower individuals. Specifically, the study found that there are various projects in the areas of infrastructure, awareness, electronic services delivery and capacity building.

The research results illustrated that awareness campaigns are one of the factors in the success of e-government projects. Pilot projects should appeal to a wide audience of citizens and government units, as does the One-Stop Shop pilot project initiated by the Ministry of Commerce and Industry (discussed in chapter four). Basically, government employees and end-users need to be made aware of an e-government program, its objectives and how it will affect them. Public-sector organisations also need to ensure that government employees are trained to work with projects employing web-based technology.

Having a change management strategy in place will help facilitate the smooth and successful implementation of e-government projects and reduce the impact of any obstacles that may arise.

In addition, the evidence from this study suggested that government institutional frameworks are very important in shaping organisational characteristics and e-government initiatives. It is widely expected that higher levels of perceived relative advantage will strengthen the intention of citizens and private-sector organisations to use e-government services. Therefore, public-sector organisations should identify – and communicate to citizens – the advantages of using online services as opposed to other means of retrieving information from and completing transactions with government organisations.

The current research found that there are many reasons for establishing partnerships with the private sector in developing e-government projects. Foremost among these is the opportunity for technology transfer from the private to the public sector, given that the Oman private sector is technologically far more advanced than public-sector organisations. It was recommended for government officials to partner with private-sector organisations, in order to tap their IT capability and find technical solutions for providing online services. Such cooperation with the private sector can facilitate effective e-government implementation through the provision of technical help and defining the necessary safeguards for security and privacy assurance. This study has shown that the government sector should encourage private-sector investment by complementing and supporting private-sector efforts.

The key to e-government acceptance and success lies in improving citizens' access to service delivery; public-sector organisations therefore should not attempt to create products and services which public-private partnerships or private service providers can provide more efficiently and effectively. The results of this study also indicated that the commitment of key staff to support user involvement is crucial to an organisation's readiness for e-government. In addition, the study indicated the important role of champions within government organisations to foster the development and implementation of e-government projects.

As to the obstacles likely to be faced in developing e-government projects, the results revealed that many limitations hinder their development in Oman. These include poor telecommunication services, issues of public trust, privacy and security issues, the lack of training programs for the public and lack of an adequate legislative framework. The research results also indicated that issues such as the limited availability of broadband and high Internet service costs are major obstacles to the development of future e-government projects.

In addition, the results stressed the need for government organisations to utilise their available resources to overcome the many barriers and challenges facing the application of e-government initiatives in Oman. Furthermore, the research results pointed out that lack of readiness on the part of citizens will limit their usage of e-government as much as limited Internet access will.

One of the main challenges in setting up e-government services is gaining the confidence of users by offering guarantees of information protection. As indicated from the research results, security concerns are one of the reasons for low adoption rates of e-government projects offered by public-sector organisations. To develop sustainable and successful e-government initiatives, government must pay particular attention to legal and political considerations. It is expected that users of e-government services will not go online if they do not trust the new method of dealing with government organisations. Furthermore, users of e-government services need to be reassured about the security of e-payment systems.

The research results acknowledged a general understanding that the success in the development of e-government projects is not only about the complexity of technology; rather, it is more related to organisational, behavioural and surrounding environmental influences. This research finding helps to explain the types of factors

that facilitate the successful development of e-government initiatives and reveals the importance of management support to the success of such initiatives.

8.3 Research contributions

This research could provide a basis for future studies on the acceptance of e-government projects. The research models could serve as a primary framework for public-sector organisations in Oman to address their e-government projects. That is, findings might be taken into consideration by Omani public sector organisations to promote their e-government projects. In other words, success factors such as publicity and awareness sessions, incentives, and low-cost telecommunication services might be tackled by concerned government officials to promote the high uptake of e-government initiatives. In fact, this research is different from previous e-government studies. It integrated the three major factors that might influence the adoption and implementation of successful e-government projects. The current findings add to a growing body of literature on e-government project development and build upon the results of previous studies (Ho, 2002; Hinnant, 2002; Carter & Belanger, 2004; Ho & Ni, 2004) on the acceptance of new technologies such as e-government and e-commerce projects. In addition, this study advances the knowledge of those factors that influence the successful implementation of e-government projects through the empirical test of a research model. In general, the study laid a theoretical path for the successful development of e-government initiatives; it also demonstrated the efficacy of the diffusion of innovation theory applicability to the public sector when tested with data collected from public organisations.

The study makes a worthwhile contribution to the theory and practice of e-government because there is societal consensus regarding the added value of implementing e-government projects by public-sector organisations. That contribution could be linked to the limited literature and studies conducted to date on the successful implementation of e-government by the public sector in developing countries. In general, the study presents an introductory model that explains 59.9% of the variance in successful public-sector development of e-government initiatives.

The findings suggest that most of the factors traditionally cited in the implementation literature (e.g. management support, resources) do affect the success of implementation; however, other factors are needed to explain the quality of e-

government projects themselves. The implementation of e-government projects requires a collaborative effort by the various stakeholders including citizens, government officials and the private sector. It has been seen that adopting a broader approach which takes account of organisational features, the perceived characteristics of innovations and surrounding environmental influences would yield a better understanding of the initiative.

Taken together, the study findings suggest a critical role to be played by government policy and the e-government legal framework in promoting the successful development of e-government projects.

8.4 Implications for practice

This study contributes to a better understanding of successful e-government by examining multiple factors and theorising about their interrelationships. As e-government grows in importance and priority for governments worldwide, an understanding of the factors that influence the public's adoption of these online services is invaluable. The evidence from this study suggests that success factors are strongly related to technological, organisational and environmental factors. It is expected that e-government applications will enhance the relationship between citizens and public-sector organisations.

This study identifies several influences that are exerted by organisation-level characteristics. Managerial strategies and practices are clearly important factors for e-government success. Strategies such as appropriate government policies and awareness campaigns have a direct influence on the success of e-government initiatives. Similarly, the IT capability of public organisations (general organisational factors) also has a direct effect on e-government success. Each of these factors is very important to an understanding of successful e-government initiatives. This study provides evidence about the potential effects of institutional change on certain organisational characteristics and, subsequently, on the successful implementation of e-government.

The results of this investigation show that a strong telecommunications infrastructure plays a key role in the success of e-government projects as does the legal and regulatory environment, in which the provision of secure electronic transactions is one of the critical issues in the application of electronic business. In

addition, the study outcomes stress the necessity to create cooperation between government and the private sector in order to improve the effective spread of e-government services.

The study found the most important criteria for e-government services are adequate funding to create the opportunity for success; return on investment; job readiness and service; and the level of demand. The study concluded that an e-government project requires integration, planning and preparation of technical and human resources and awareness, commitment and support at the highest levels in order to be successful and able to achieve its goals.

8.5 Recommendations for government organisations

There are some lessons for public sector managers and decision-makers to be derived from this study. Some guidelines it provides include training, promotions and educational assistance in order to overcome resistance to the adoption and acceptance of e-government projects, as well as other problems that may arise in the process. The study found that the support of senior government officials is a key ingredient for the successful development of e-government projects. In addition, public-sector organisations need to develop their capacity to manage IT outsourcing projects and also to build an appropriate level of IT capability. It was found that the support of top management is critical to overcoming employees' initial resistance to the new learning necessary to operate e-government services. Decision-makers within public organisations should recognise the importance of outsourcing and, as a result, provide such projects with continual leadership and support.

Financial resources are important, but organisational capabilities and management strategies are also important determinants of e-government success. The availability of adequate human resources and training options are two further important factors. An organisation's IT capability would allow government IT staff to identify key pieces of technology needed; develop performance measures for service-level contract negotiation, and monitor performance. Senior managers in public organisations need to offer not only leadership and support; they should also facilitate communication and collaboration between various government organisations.

It is evident from this study that e-government is about transforming the way government interacts with the governed. The results indicate that the success of e-government requires fundamental changes to how government works and how people

view the ways in which government helps them. Finally, the research results have identified that the development of e-government projects requires continued political support to succeed and public-sector organisations will have to explore new relationships with other government organisations as well as partnerships with the private sector to ensure greater integration of e-government services.

8.6 Limitations

This current study was not designed specifically to evaluate factors related to cultural issues. The questionnaire attempted to measure a number of dimensions and it could not survey all of the respondents' opinions and perceptions. Also, as the questionnaire was self-reported by the respondents, it involved the potential problems of honesty and the presence or absence of motivation to provide accurate responses.

Another limitation of this research rests with the number of interviews conducted with participants and the period over which the study took place. Optimum sample size in qualitative studies depends on what the researcher desires to learn, the purpose of the study, and the available time and resources. Additional interviews with government officials involved in developing and implementing information technology projects would have resulted in greater understanding of the critical points of these projects. However, given the limited number of interviews conducted, caution must be applied in that the findings might not be transferable to other public organisations. Nonetheless, the findings generated from this study may well be applicable in environments similar to Oman.

The most important limitation lies in the social and cultural range represented by the sample. This study is particular to public-sector employees in Oman, which could be considered a limitation with respect to generalisation. The sample also included undergraduate students and the use of student subjects may limit the generalisability of the results. Another limitation would be the possibility of biased responses from the survey respondents.

8.7 Future research opportunities

This research has thrown up many questions in need of future investigation. The research model can serve as a starting point for other research into the adoption of e-government, while encouraging further exploration and integration of additional

adoption constructs. However, this study provides evidence of how complex it is to understand government institutional frameworks. Thus, future e-government research should take into consideration a larger set of contextual factors and develop a better explanation of this institutional construct.

Future research might explore and compare e-government users according to their demographic characteristics and the frequent use of available e-government services in Oman such as those offered by ROP or the Muscat Municipality. It would also be interesting to assess the effects of a wider sample of participants in respect of age, gender, income and educational background. Considerably more work will need to be done to integrate constructs from the technology acceptance model and to develop a comprehensive model of e-government development and acceptance by the public in general.

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10 APPENDIXES

Appendix A: Ministry of Higher Education in Oman Letter

بسم الله الرحمن الرحيم

سلطنة عمان
وزارة التعليم العالي

الرقم : د.د.ع/٧٤٩
التاريخ : ٥ الموافق ٢٦/٦/٢٠٠٦م

شهادة لمن يهمه الأمر

تشهد دائرة الدراسات العليا بوزارة التعليم العالى بأن المهندس/عبدالله بن جمعه بن حمد بريام مبتعث لمواصلة دراسته العليا للحصول على درجة الدكتوراه في مجال الحكومة الإلكترونية بجامعة جريفث بأستراليا ويقوم حالياً بإعداد بحث بعنوان (تبني وتطبيق مشاريع الحكومة الإلكترونية في سلطنة عمان) وهو حالياً متواجد بالسلطنة لجمع المعلومات اللازمة لبحثه .

نرجو التكرم بمساعدة المذكور في الحصول على المعلومات والبيانات المطلوبة.

وتفضلوا بقبول وافر الإحترام ،،،،،

سعيد بن سالم الوهيبي

مدير الدراسات العليا

Appendix B: Questionnaires

A Framework for the Development of Electronic Government Projects in Public Service Organisations in Oman

A questionnaire conducted by
Abdullah Baryaa
School of Information Systems,
Victoria University of Technology
Melbourne, Australia

Dear Respondent,
I am inviting you to participate in a research project to study the development of electronic government projects among the public-sector organisations in Oman. Governments around the world have been attempting to take the advantage of Information and Communication Technology to improve their public-sector services. Along with this letter is a short questionnaire that asks about the importance of various factors that could lead to the success of electronic government projects at public-sector service organisations.

I would like to thank you for taking the time to respond to this questionnaire.

Sincerely,

Abdullah Juma Baryaa
PhD Candidate
School of Information Systems
Victoria University of Technology
Melbourne
Australia
E-mail: Adullah.Baryaa@research.vu.edu.au
Oman contact: 99316118

Professor Michael McGrath
Principal Supervisor
School of Information Systems
Victoria University of Technology
Melbourne
Australia
E-mail: Michael.McGrath@vu.edu.au

I have read the information sheet and the consent form. I agree to participate in the study and give my consent freely. I understand that the study will be set out as described in the information statement, a copy of which I have retained. I realise that whether or not I decide to participate is my decision. I also realise that I can withdraw from the study at any time and that I do not have to give any reasons for withdrawing. I have all questions answered to my satisfaction.

Signature: ....
Participant Date

E-government is defined as 'the transformation of public-sector internal and external relationships through internet enabled operations and information, technology and communication (ICT), to optimise government service delivery, constituency participation and governance.'

Please provide the following background information:

a. Organisation name (Optional):.....

b. Number employed by your organisation: .....

c. Population served by your organisation: .....

d. Your job title: Admin./Clerical Technical Supervisory Managerial Executive Other

e. Number of years employed by your organisation: Years:.....

f..Your Gender: Male Female

g. Your age group: 20-30 31-40 41-50 51-60 61+

h. Level of education: High School Bachelor's Master's Doctorate Other

1. Please rate the importance of the following factors that can contribute to the successful development of e-government projects in general. *(For each item below, please place a checkmark in the box that best describes your view)*

1 = unimportant, 2 = of little importance, 3 = neutral, 4 = important, 5 = very important

1. Set-up costs for e-government project	1	2	3	4	5
2. Training costs	1	2	3	4	5
3. Maintenance costs	1	2	3	4	5
4. Integration costs with existing technical infrastructures	1	2	3	4	5
5. Lack of legislative support and formal policy	1	2	3	4	5
6. Laws/regulations prohibiting online business	1	2	3	4	5

2. Please rate the importance of the following items that can be achieved as a result of implementing e-government project. Please reflect your own views.

1 = unimportant, 2 = of little importance, 3 = neutral, 4 = important, 5 = very important

7. Reduces paperwork.	1	2	3	4	5
8. Reduces overall costs of organisation operations.	1	2	3	4	5
9. Reduces organisation paper flow.	1	2	3	4	5
10. Reduces duplicate data collection, processing, and storage.	1	2	3	4	5
11. Improves productivity.	1	2	3	4	5
12. Improves information and services accuracy.	1	2	3	4	5
13. Improves information and services comprehensiveness.	1	2	3	4	5
14. Improves information and services accessibility.	1	2	3	4	5
15. Improves information and services timeliness.	1	2	3	4	5
16. Improves decision- and policy-making.	1	2	3	4	5
17. Improves intra- and inter-organisation integration of computer systems.	1	2	3	4	5

18. Improves relationships between government organisations.	1	2	3	4	5
19. Improves public services	1	2	3	4	5
20. Improves accountability.	1	2	3	4	5
21. Improves public image/reputation.	1	2	3	4	5

3. Please indicate your level of agreement or disagreement with the items below that describe a factor that can potentially contribute to the success of e-government project.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

22. Our top management has communicated its support for e-government initiatives.	1	2	3	4	5
23. Our top management is interested to adopt e-government projects.	1	2	3	4	5
24. Our top management considers e-government projects important to the organisation.	1	2	3	4	5
25. Information technologies required for e-government initiatives are difficult to understand and use	1	2	3	4	5
26. E-government initiatives are a complex process.	1	2	3	4	5
27. Our employees are computer-literate	1	2	3	4	5
28. There is at least one employee within our organisation who is a computer expert	1	2	3	4	5
29. Our organisation has strong technical support	1	2	3	4	5
30. Our employees' fears and concerns about accepting new technology have been observed	1	2	3	4	5
31. Our organisation has a good telecommunications infrastructure.	1	2	3	4	5
32. Our organisation has integrated information systems applications about different functional areas	1	2	3	4	5
33. Our organisation uses database applications regularly in daily operations	1	2	3	4	5
34. Overall, our organisation has adequate information technology capability of supporting e-government initiatives	1	2	3	4	5
35. E-government concept is consistent with our organisation's needs	1	2	3	4	5
36. E-government concept is consistent with our organisation's existing standard operating procedures	1	2	3	4	5
37. E-government concept is consistent with our organisation's beliefs, values, and experience with similar systems	1	2	3	4	5
38. E-government concept is compatible with our organisation's telecommunication infrastructure	1	2	3	4	5
39. E-government concept is compatible with our organisation's existing information systems applications	1	2	3	4	5
40. The financial costs of adopting e-government initiatives would be significant.	1	2	3	4	5
41. Our organisation has adequate financial resources to adopt and implement e-government projects.	1	2	3	4	5
42. If significant barriers did not exist, our organisation would develop e-government projects.	1	2	3	4	5
43. In the future, our organisation intends to adopt and implement electronic services delivery initiatives.	1	2	3	4	5
44. Other public-sector organisations could influence our decision to adopt e-government projects	1	2	3	4	5

45. Other public organisations recommended that our organisation should adopt e-government projects	1	2	3	4	5
46. Other public organisations requested that our organisation adopt e-government projects	1	2	3	4	5
47. Public-sector organisations should provide information regarding the advantages of adopting e-government projects	1	2	3	4	5
48. Public-sector organisations should provide information regarding the disadvantages of not adopting e-government projects	1	2	3	4	5
49. Adequate legislation or formal policies exist to organise electronic services delivery	1	2	3	4	5
50. There is at least one influential individual within our organisation who supports and promotes the initiatives	1	2	3	4	5
51. There is at least one influential individual or organisation within the government who supports and promotes the e-government initiatives	1	2	3	4	5

4. If there is an influential individual within your organisation who supports and promotes the implementation of e-government initiatives:

a) What level are these people within the organisation?

.....

b) How would you rate the support, encouragement and information technology knowledge of these people to develop e-government projects?

None Very Low Moderate High Very High

5. If there is at least one influential individual within the government who supports and promotes electronic services initiatives:

a) At what level are these people in the government?

.....

b) How would you rate the support, encouragement and information technology knowledge of these people to develop e-government projects?

None Very Low Moderate High Very High

6. In your opinion, what are the major barriers to successful development of e-government initiatives?

.....
.....

7. In your opinion, what are the most important factors for successful development of e-government initiatives?

.....
.....

8. In your opinion, what incentives are necessary for public organisations to develop and manage successful e-government projects?

.....
.....

Thank you for your cooperation in completing this survey.

Appendix C: Participants interview protocol

A Framework for the Development of Electronic Government Projects in Public Service Organisations in Oman

Dear,

Many countries around the world have adopted and implemented e-government strategies to assist delivery and access to government services. As a result of this global phenomenon, most Gulf Cooperation Council (GCC) governments, including Oman, have been very quick to realise the potential of Information and Communication Technologies (ICT) in driving growth and sustainable development in their region.

This study conducted by Abdullah Baryaa (PhD student) of Victoria University aims to investigate the factors that might influence the successful development of electronic government initiatives in public-sector organisations in Oman.

Your participation in this research is voluntary; you have the right to withdraw at any point of the study for any reason without any prejudice. The interview guide attached will take approximately 45 minutes to complete and fill in. If you choose to assist, please sign the consent form below and send me back your answers via e-mail or let me know when can I collect them in person. You have the option of indicating if you wish receive a copy of the results, which will show summarised results.

Please do not answer any questions that you feel uncomfortable with; you are encouraged to ask any questions at any time about the nature of the study and the methods that I am using. Results will be entered into a computer database. The results will be stored securely for five years. You will have a chance to view any reports regarding the results of the study bearing your name before publication. If you have any queries, please e-mail me at any time.

Yours faithfully,

Abdullah Baryaa
School of Information Systems

I agree to participate in the study, *A Framework for the Development of Electronic Government Projects in Public Service Organisations in Oman,* and answer the interview questions. I understand that I can refuse to answer any questions that I am uncomfortable with. If I have queries or concerns, I understand that I can contact the *Victoria University* Faculty of Business and Law Human Research Ethics Committee, quoting

_____ _____ ___/___/_____

Signature Name Date

Background Information

Number of years you have been working for this organisation..... years, in this position ..... years.

Your gender: .....

Your title:.....

Your organisation:.....

Participants were asked to discuss and describe their perceptions and views about the following questions:

Specific Questions

Benefits

- What are the expected benefits as a result of adopting and implementing e-government initiatives?
- Do you think that the gaining the expected benefits would be an important factor for developing an e-government project?

Costs

- In the context of your organisation's overall budget, how significant is it to adopt e-government initiatives? Have you incurred any costs? What kinds of costs?

Compatibility

- Do you think it is easy to integrate e-government systems with your existing computer systems? Do you think they will be compatible?
- Do you think adopting and implementing e-government initiatives will require few, moderate or many changes in the way the work will be done?
- Do you think that the e-government initiative is compatible with the organisation's needs?

Complexity

- Do you think that providing public services through electronic means is an easy/difficult concept?
- Do you think that the e-government system is difficult to use in general, or is it user-friendly?

IT Capability

- How much of your organisation's operations are computerised?
- How many IT people does your organisation have? Does your organisation have a professional IT manager?
- Are the employees in the organisation computer-literate? Are they knowledgeable about and comfortable with computer use?

Top Management Support

- What is the attitude of the high-ranking officials toward the deployment of such information technology systems as e-government?
- What about the attitudes of the employees?

Organisation Size

- Approximate number of employees in your organisation .....
- Population served by your organisation.....

Organisation Championship

- Is there any one who is responsible for supporting the implementation of this electronic public services initiative in your organisation?
- How do you evaluate his/her knowledge on the Information Systems applications in general?

External Influence

- How would you characterise the level of encouragement or pressure put on your organisation by other influential organisations to develop e-government initiative?
- In general, do you think that the external intervention might have an influence to develop successful e-government initiatives?
- Has your organisation received (or is it expecting) any kind of aid from other government bodies in order to adopt and develop e-government initiatives?

Policy/Legal Framework

- Do you think adequate government legislation or formal policies to organise and provide e-government initiatives are in place?
- What is the role of legislation? Do you think that adopting such initiatives should be mandated by law?

General Questions

- Can you summarise the factors that could motivate the organisation to adopt and develop e-government initiatives?
- In your opinion, what are the most important factors for successful electronic service delivery initiatives in general?
- If you compare your organisation to those that are not developing similar initiatives, what are the major differences?
- Is your organisation currently providing any other electronic services initiatives with other organisations?
- In your opinion, what incentives are necessary to increase the level of adoption of e-government initiatives?
- In your opinion, what are the barriers to public-sector organisations adopting electronic service delivery initiatives in general?

Appendix D: Statistical analysis - supporting documentation

Correlation Results of Sex and Key Success Factors

		Sex	IT CAP	External influence	Advantage	E-govt development	Political & legal	Compatibility	Mgmt. support
Sex	Pearson Correlation	1							
	Sig. (2-tailed)	.							
IT CAP	Pearson Correlation	.012	1						
	Sig. (2-tailed)	.839	.						
External influence	Pearson Correlation	.049	.562	1					
	Sig. (2-tailed)	.391	.000	.					
Advantage	Pearson Correlation	.086	.364	.359	1				
	Sig. (2-tailed)	.132	.000	.000	.				
E-govt development	Pearson Correlation	-.008	-.337	-.251	.465	1			
	Sig. (2-tailed)	.892	.000	.000	.000	.			
Political legal	Pearson Correlation	-.024	.161	.232	.122	.091	1		
	Sig. (2-tailed)	.669	.005	.000	.032	.111	.		
Compatibility	Pearson Correlation	-.057	.145	.092	.162	.196	.274	1	
	Sig. (2-tailed)	.322	.011	.110	.005	.001	.000	.	
Management support	Pearson Correlation	-.012	-.046	-.024	.123	.249	.097	.130	1
	Sig. (2-tailed)	.836	.418	.675	.031	.000	.088	.024	.

Correlation Results of Age Range and Key Success Factors

		IT CAP	External influence	Advantage	E-govt development	Political & legal	Compatibility	Mgmt. support	Age range
IT CAP	Pearson Correlation	1							
	Sig. (2-tailed)	.							
External influence	Pearson Correlation	.562	1						
	Sig. (2-tailed)	.000	.						
Advantage	Pearson Correlation	.364	.359	1					
	Sig. (2-tailed)	.000	.000	.					
E-govt development	Pearson Correlation	-.337	-.251	.465	1				
	Sig. (2-tailed)	.000	.000	.000	.				
Political legal	Pearson Correlation	.161	.232	.122	.091	1			
	Sig. (2-tailed)	.005	.000	.032	.111	.			
Compatibility	Pearson Correlation	.145	.092	.162	.196	.274	1		
	Sig. (2-tailed)	.011	.110	.005	.001	.000	.		
Management support	Pearson Correlation	-.046	-.024	.123	.249	.097	.130	1	
	Sig. (2-tailed)	.418	.675	.031	.000	.088	.024	.	
Age range	Pearson Correlation	.060	.072	.041	-.035	.026	.101	.066	1
	Sig. (2-tailed)	.297	.205	.472	.542	.644	.077	.246	.

Correlation Results of Education Level and Key Success Factors

		IT CAP	External influence	Advantage	E-govt development	Political & legal	Compatibility	Mgmt. support	Education level
IT CAP	Pearson Correlation	1							
	Sig. (2-tailed)	.							
External influence	Pearson Correlation	.562	1						
	Sig. (2-tailed)	.000	.						
Advantage	Pearson Correlation	.364	.359	1					
	Sig. (2-tailed)	.000	.000	.					
E-govt development	Pearson Correlation	-.337	-.251	.465	1				
	Sig. (2-tailed)	.000	.000	.000	.				
Political legal	Pearson Correlation	.161	.232	.122	.091	1			
	Sig. (2-tailed)	.005	.000	.032	.111	.			
Compatibility	Pearson Correlation	.145	.092	.162	.196	.274	1		
	Sig. (2-tailed)	.011	.110	.005	.001	.000	.		
Management support	Pearson Correlation	-.046	-.024	.123	.249	.097	.130	1	
	Sig. (2-tailed)	.418	.675	.031	.000	.088	.024	.	
Education level	Pearson Correlation	.029	.094	.130	.077	.010	.087	.037	1
	Sig. (2-tailed)	.610	.099	.023	.175	.864	.132	.521	.

Appendix E: Correlation results of work position and key success factors

		IT CAP	External influence	Advantage	E-govt development	Political & legal	Compatibility	Mgmt. support	Position
IT CAP	Pearson Correlation	1							
	Sig. (2-tailed)	.							
External influence	Pearson Correlation	.562	1						
	Sig. (2-tailed)	.000	.						
Advantage	Pearson Correlation	.364	.359	1					
	Sig. (2-tailed)	.000	.000	.					
E-govt development	Pearson Correlation	-.337	-.251	.465	1				
	Sig. (2-tailed)	.000	.000	.000	.				
Political legal	Pearson Correlation	.161	.232	.122	.091	1			
	Sig. (2-tailed)	.005	.000	.032	.111	.			
Compatibility	Pearson Correlation	.145	.092	.162	.196	.274	1		
	Sig. (2-tailed)	.011	.110	.005	.001	.000	.		
Management support	Pearson Correlation	-.046	-.024	.123	.249	.097	.130	1	
	Sig. (2-tailed)	.418	.675	.031	.000	.088	.024	.	
Position	Pearson Correlation	-.078	-.111	-.034	.081	-.077	-.012	-.008	1
	Sig. (2-tailed)	.170	.051	.553	.158	.178	.841	.895	.

Correlation Results of Work Experience and Key Success Factors

		IT CAP	External influence	Advantage	E-govt development	Political & legal	Compatibility	Mgmt. support	Work experience
IT CAP	Pearson Correlation	1							
	Sig. (2-tailed)	.							
External influence	Pearson Correlation	.562	1						
	Sig. (2-tailed)	.000	.						
Advantage	Pearson Correlation	.364	.359	1					
	Sig. (2-tailed)	.000	.000	.					
E-govt development	Pearson Correlation	-.337	-.251	.465	1				
	Sig. (2-tailed)	.000	.000	.000	.				
Political & legal	Pearson Correlation	.161	.232	.122	.091	1			
	Sig. (2-tailed)	.005	.000	.032	.111	.			
Compatibility	Pearson Correlation	.145	.092	.162	.196	.274	1		
	Sig. (2-tailed)	.011	.110	.005	.001	.000	.		
Management support	Pearson Correlation	-.046	-.024	.123	.249	.097	.130	1	
	Sig. (2-tailed)	.418	.675	.031	.000	.088	.024	.	
Work experience	Pearson Correlation	.028	.072	.025	-.016	.113	.135	.023	1
	Sig. (2-tailed)	.625	.205	.660	.784	.049	.018	.682	.

Correlation Results of Organisation Size and Key Success Factors

		IT CAP	External influence	Advantage	E-govt development	Political & legal	Compatibility	Mgmt. support	Organisation size
IT CAP	Pearson Correlation	1							
	Sig. (2-tailed)	.							
External influence	Pearson Correlation	.562	1						
	Sig. (2-tailed)	.000	.						
Advantage	Pearson Correlation	.364	.359	1					
	Sig. (2-tailed)	.000	.000	.					
E-govt development	Pearson Correlation	-.337	-.251	.465	1				
	Sig. (2-tailed)	.000	.000	.000	.				
Political & legal	Pearson Correlation	.161	.232	.122	.091	1			
	Sig. (2-tailed)	.005	.000	.032	.111	.			
Compatibility	Pearson Correlation	.145	.092	.162	.196	.274	1		
	Sig. (2-tailed)	.011	.110	.005	.001	.000	.		
Management support	Pearson Correlation	-.046	-.024	.123	.249	.097	.130	1	
	Sig. (2-tailed)	.418	.675	.031	.000	.088	.024	.	
Organisation size	Pearson Correlation	.026	-.023	-.084	-.057	-.061	.062	-.059	1
	Sig. (2-tailed)	.645	.691	.140	.322	.290	.281	.299	.

Correlation Results of Key Significant Variables and e-Government Development

		Management support	Compatibility	Political & legal	E-govt development	Advantage	External influence	IT Cap
Management support	Pearson Correlation	1						
	Sig. (2-tailed)							
Compatibility	Pearson Correlation	.130	1					
	Sig. (2-tailed)	.024						
Political & legal	Pearson Correlation	.097	.274	1				
	Sig. (2-tailed)	.088	.000					
E-govt development	Pearson Correlation	.249	.196	.091	1			
	Sig. (2-tailed)	.000	.001	.111				
Advantage	Pearson Correlation	.123	.162	.122	.465	1		
	Sig. (2-tailed)	.031	.005	.032	.000			
External influence	Pearson Correlation	-.024	.092	.232	-.251	.359	1	
	Sig. (2-tailed)	.675	.110	.000	.000	.000		
IT Cap	Pearson Correlation	-.046	.145	.161	-.337	.364	.562	1
	Sig. (2-tailed)	.418	.011	.005	.000	.000	.000	

Appendix F: List of Oman public-sector organisations websites

	Organisation	Short Name	Website
1	Ministry of National Economy	MoNE	www.mne.gov.om
2	Muscat Municipality	NM	www.mne.gov.om
3	Royal Oman Police	ROP	www.rop.gov.om
4	Tender Board	TB	www.tenderboard.gov.om
5	Ministry of Information	MoInf	www.omanet.gov.om
6	Ministry of National Heritage & Culture	MoNHC	www.mnhc.gov.om
7	Ministry of Social Development	MoSD	www.mosd.gov.om
8	Ministry of Interior	MoI	www.moi.gov.om
9	Ministry of Tourism	MoT	www.omantoruism.gov.om
10	Ministry of Civil Service	MoCS	www.mocs.gov.om
11	Ministry of Manpower	MoMP	www.manpower.gov.om
12	Ministry of Health	MoH	www.moh.gov.om
13	Ministry of Education	MoE	www.moe.gov.om
14	Ministry of Higher Education	MoHE	www.mohe.gov.om
15	Ministry of Commerce & Industry	MoCI	www.mocioman.gov.om
16	Ministry of Regional Municipalities & Environmental & Water Resources	MRMEWR	www.mrmewr.gov.om
17	Ministry of Agriculture & Fisheries	MoAF	www.maf.gov.om
18	Oman Chamber of Commerce and Industry	OCCI	www.chamberoman.gov.om
19	Telecommunication Regulatory Authority	TRA	www.tra.gov.om
20	Information Technology Authority	ITA	www.ita.gov.om
21	Oman Telecommunication Company	Omantel	www.omantel.net.om
22	Public Establishment for Industrial Estates	PEIE	www.peie.gov.om
23	Public Authority for Craft Industries	PACI	www.paci.gov.om
24	Knowledge Oasis Muscat	KOM	www.kom.gov.om
25	Omani Center for Investment Promotion and Export Development	OCIPED	www.ociped.gov.om
26	Digital Oman ICT Magazine	DO	www.digitaloman.gov.om
27	Petroleum Development Oman	PDO	www.pdo.gov.om
28	Muscat Securities Market	MSM	www.msm.gov.om
29	Capital Market Authority	CMA	www.cma-oman.gov.om