Critical Factors in the Adoption and Diffusion of E-government Initiatives in Oman

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For My Parents, My Wife & Son

Declaration

"I, Hafedh AlShihi, declare that the PhD thesis entitled *Critical Factors in the Adoption and Diffusion of E-government Initiatives in Oman* is no more than 100,000 words 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: _____

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Abstract

Many significant barriers must be faced in the adoption and dissemination of e-government systems regardless of how advanced or modest a country is in terms of ICT infrastructure and deployment. This research has endeavored to investigate the impediments associated with the development and diffusion of e-government with a concentration on non-technical and country-specific factors. The focus of the research was on Oman's efforts to develop an e-government system, using advanced nations' experiences in the same domain to establish benchmarks.

Initially, this research undertook a general literature review to define the barriers to the uptake of e-government and to set and refine aims, scope and questions asked of the research. Subsequently, a more focused literature review was conducted on the experiences of advanced nation with e-government, to identify possible lessons for and solutions to barriers facing the take-up of e-government. In parallel, an exploratory case study of the Oman e-government project was conducted that aimed to test the extent to which the barriers and solutions drawn from the largely Western-centric literature apply in the Omani situation, and to investigate other possible cultural and country-specific barriers. Semi-structured interviews and face-to-face administered questionnaires were the primary data collection strategies used throughout the case study phase.

The study found that non-technical barriers in Oman, such as users' lack of IT knowledge and the absence of marketing campaigns, have negatively affected people's decisions to use the technology and inhibited decision makers from implementing or adopting technology initiatives. In addition, several country-specific limits to e-government growth were identified. Government decision makers in Oman were found to be prone to short-term planning, which prevents them from anticipating the long-term potential of e-government. Additionally, frequent structural changes within ministries, and the fact that the e-government project is not given high priority nor urgently needed at present, have contributed in delaying development of and improvements to such a system. Ultimately, this research delivered a socio-technical framework for adoption, detailing causes and effects of the critical factors in the adoption and diffusion of e-government initiatives in Oman.

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Abbreviations

ADSL	Asymmetric Digital Subscriber Line
AGIMO	Australian Government Information Management Office
ATM	Asynchronous Transfer Mode
ATO	Australian Taxation Office
B2C	Business-to-Consumer
B2B	Business-to-Business
CBO	Central Bank of Oman
DAC	Digital Arabic Content
E-government	Electronic Government
ESCWA	United Nations Economic and Social Commission for Western Asia
G2C	Government-to-Citizen
G2B	Government-to Business
G2G	Government-to-Government
G2E	Government-to-Employee
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GPRS	General Packet Radio Service
ICDL	International Computer Driving Licence
ICT	Information and Communication Technology
IPR	Intellectual Property Rights
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IT	Information Technology
ITTF	Information Technology Task Force
ITTS	Information Technology Technical Secretariat
KOM	Knowledge Oasis Muscat
MMDS	Multi-channel Multipoint Distribution Service
MMS	Multimedia Message Services
MPLS	Multi-Protocol Label Switching
NOIE	National Office for the Information Economy
OAB	Oman Arab Bank
OCIPED	Omani Center for Investment Promotion and Export Development
OECD	Organisation for Economic Co-operation and Development
OIFC	Oman Investment and Finance Company
OmanTel	Oman Telecommunications Company
OMR	Omani Rial
PC	Personal Computer
PCT	Patent Cooperation Treaty
PDA	Personal Digital Assistants
PDO	Petroleum Development Oman
PKI	Public Key Infrastructure
RDI	Research, Development and Innovation

ROI	Return On Investment
ROP	Royal Oman Police
RTGS	Real Time Gross Settlement
SAP	Systems Applications and Products
SMS	Short Message Services
SWOT	Strengths-Weaknesses-Opportunities-Threats
TAM	Technology Acceptance Model
TRA	Telecommunications Regulatory Authority
TRIPS	Agreement on Trade-related Aspects of Intellectual Property Rights
UN	United Nations
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNPAN	United Nations Online Network in Public Administration and Finance
VDSL	Very high bit rate Digital Subscriber Line
VSAT	Very Small Aperture Terminal
W3C	World Wide Web Consortium
WAP	Wireless Application Protocol
WAI	Web Accessibility Initiative
WiFi	Wireless Fidelity
WLAN	Wireless Local Area Network
WLL	Wireless Local Loop
WTO	World Trade Organisation

1.0 Introduction

The internet is now ubiquitous. In the past, it was mainly used for educational and information provision and sharing purposes (Schneider and Perry, 2000), but internet applications now facilitate many essential day-to-day activities. E-government is an important application of the internet and is used by authorities to encourage broad use of computers and to facilitate communication and interactions with its institutions, citizens and businesses. The World Bank Group (2002) defines e-government as "the use by government agencies of information technologies (such as wide area networks, the internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government…".

Some governments view ICT (Information and Communication Technology) and e-government as a tool to project their image as an advanced IT (Information Technology)-oriented jurisdiction (Poon, 2002), whilst others believe in ICT's advantages and long-term benefits for the well being of citizens, businesses and government entities. Most importantly, e-government systems need solid planning and vision. IT should be viewed as the means not the desired end and, importantly, it should match the local environment; specifically culture, values and needs (Commonwealth Telecommunications Organisation, 2002). Another important issue with e-government development is infrastructure, which can be very costly to build. Governments might think that they will lose control of internet development and the internet flow of information if they privatize building infrastructure (Huff, 2001). Security is perhaps the most vital concern in e-government. Governments must ensure high security in their web sites in order to earn users' trust. For instance, 32% of 395 IT professionals

interviewed in the U.S. claimed that most e-government programs are not adequately secured (Dix, 2002).

Regardless of how advanced countries are in terms of ICT infrastructure and deployment, many technical and non-technical obstacles must be faced in the adoption and dissemination of e-government. Such issues are crucial to the successful implementation of effective e-government systems and therefore should be planned and examined carefully. Infrastructure issues are the most common technical inhibitors to e-government development and dissemination, and this factor is particularly relevant to developing countries. Aladwani (2003) found that internet cost is beyond the purchasing power of an average citizen in the Arab world. In Oman for example, a dial-up connection to the internet costs around AUS$ 0.78 per hour, or AUS$ 18.72 a day “24 hours” and AUS$ 131.04 a week “24/7” (Oman Telecommunication Company, 2003).

The importance of culture and non-technical issues has encouraged many researchers to examine issues in and between different nations, especially in the field of internet-based applications (for example, see Lowe 1998; and Stylianou 2003). In addition, such factors have negatively affected in many instances the uptake of e-government services in several advanced nations such as the UK and Japan. British people were found reluctant to use e-government (Swartz, 2003), and the Japanese were seen fearful to use e-payment systems and preferred cash based payments (Aoki, 2000).

The Arab and developing world are no different. The E-government for Development Information Exchange Project (Commonwealth Telecommunications Organisation, 2002) noted that, for e-government projects in developing and transitional countries, 35% were total failures, 50% were partial failures and only 15% were successful. This leads us to question the reasons behind these difficulties in developing and running an e-government system. What are the causes behind these failures? If the

causes are technical, then, what is wrong with the UK's e-government initiative that discourages British citizens from using it? Why are the Japanese people still anxious about paying online despite their enormous advances in technology?

It is probable that the barriers are not technical only, as the UK and Japan are considered very advanced in technology. Thus, while this project aims to investigate all impediments associated with the development and diffusion of e-government projects, it concentrates on non-technical and other country/region-specific issues. The focus of the study is on Oman's ongoing project to develop an e-government system, using Australian and other developed countries' initiatives in the same area to establish benchmarks.

This chapter provides a general description of the study's research aims, contributions to knowledge, outcomes, and the organization of the thesis.

1.1 Research Aims and Significance

E-commerce is growing at a massive rate. Turban et al (2002) projected the total value of online shopping to be in the range $US2-7 trillion in 2004, and the number of internet users worldwide to reach 750 million by 2008. Individuals, organizations and governments that do not embrace this new technology will be seriously disadvantaged. Thus, this project has major significance for Oman as it aims to address the needs and capabilities of Omani society for using e-government. In addition, it has been conducted in parallel with Oman's initiative to develop e-government.

One of the recommendations concluded in an e-government symposium held in Oman (Muscat Municipality and Arab Urban Development Institute, 2003) was to study the cultural changes associated with using e-government, list the positive and negative aspects and propose solutions. This is precisely one of the project's objectives. The

project is committed to address and resolve societal needs in relation to IT and to help in smoothing the introduction of e-government in Oman.

The project aimed primarily to investigate the effects of cultural and other country-specific factors on the development and diffusion of e-government in Oman. It has endeavored to evaluate Oman's attempt to develop its e-government infrastructure against Australian and other advanced countries' experiences in the same domain such as the UK and USA. Specifically, the project aimed to:

- define potential cultural, national and other country related variables that might hinder the development or usage level of e-government in Oman
- review Australia's and other advanced countries' experiences with e-government for lessons to be employed in (and barriers inhibiting) the uptake of e-government
- address barriers to e-government in Oman using the lessons learned from Australia and other advanced nations as a benchmark and propose possible solutions
- examine the willingness and capability of Omani people to use e-government
- provide assistance to Oman's e-government project by providing a socio-technical, theoretical framework to adoption within which new initiatives might be evaluated.

Moreover, the findings of this study are also believed to be of potential interest to a variety of groups such as:

- Government officials responsible for e-government. The study as whole is directed to meet the needs of this group by defining obstacles to adoption, proposing solutions and illustrating critical success factors.
- Officials from the private sector responsible for e-commerce. The adoption framework covers e-commerce acceptance as well as e-government, describing the crucial requirements to ensure higher usage levels.

- Scholars researching e-government. The study highlights the critical issues with e-government development and dissemination and their impacts. Scholars may investigate in depth each issue and its effects on different societies, and / or attempt to cover wider base variables such as gender for example.

1.2 Research Contribution to Knowledge

The study attempted to add significant inputs to knowledge by shedding light on culture and country/region-specific factors in e-government development and dissemination. It conducted an analysis of advanced nations e-government experiences and a case study on Oman in order to define the cultural drivers and country/region-specific variables that might obstruct the introduction of an e-government system - in the Arab world in general and Oman in particular. In addition, it has examined the awareness, eagerness and readiness of the Omani people to use e-government, reported on impediments and proposed solutions. This is believed to assist Oman and any other country with similar characteristics across key variables in the uptake and planning for e-government. Specifically, the project is:

- the first study to explore the impacts of national/cultural issues in Oman on e-government.
- the first study to use primarily the Australian e-government experience (as a typical example of a Western-style technology initiative) and other advanced nations like USA and UK as benchmarks for evaluation of the Omani project. While the focus of this study is on Oman, the results are believed to also yield useful implications for Western and other Arabic e-government initiatives. It must be emphasized, however, that this is not a comparative study, but rather, the Oman investigation will build upon Western experiences.

- the first study to provide the Omani government with the type of socio-technical framework necessary for evaluating e-government initiatives and fostering adoption.

1.3 Research Outcomes

The study aims to address the factors influencing the adoption and dissemination of e-government initiatives in Oman. In this sense, it has endeavored to produce the following:

- Framework for Adoption: this is the ultimate aim of the study. It provides a detailed treatment of the critical factors found and their causes and affects.
- Profile of e-government users in Oman. This is an in depth description of basic characteristics of those people most likely to use e-government in Oman.
- Lessons learned from advanced nations and implications for Oman. A thorough analysis of advanced experiences in e-government around the world is performed to draw valuable lessons in the adoption and diffusion of e-government, and the implications of these for the Omani situation.
- Major barriers to the uptake of e-government in Oman and proposed solutions. The literature was investigated for barriers to e-government adoption, and an Oman case study was conducted to test the effects of such obstacles on the Oman e-government project. A detailed list of major barriers and their proposed solutions is provided.
- Country-specific inhibitors to e-government growth. The Oman case study through interviews and surveys provided insights to e-government limits to growth that are specific to Oman, and a comprehensive treatment is presented.

1.4 Thesis Outline

This thesis is divided into eight chapters. Chapter one (Introduction) provides a

general direction of the aims and objectives of the research, and describes the structure of the thesis. Then, chapter two (Fundamentals of E-government) explains the basics of e-government including its definition, scope and application. It also identifies crucial issues concerning e-government and presents real e-government examples from various countries.

The research plan, data collection methods and data analysis techniques are described in Chapter three (Research Design), and Chapter four (Barriers and Lessons to the Uptake of E-government) aims to define the major barriers to e-government and proposed solutions as outlined in the literature. It also draws valuable lessons from advanced nations' experiences with e-government. Next, in Chapter five (Oman Case Study: Background), an overview of Oman, and the current status and plans to develop and improve the ICT sector and e-government in that country, are presented.

Chapter six (Oman Case Study: Surveys and Interviews) presents an analysis of the study's surveys and interviews to draw a profile of e-government users and defines key variables and relationships, and Chapter seven (Oman Case Study: The Way Forward) brings together findings from the various previous chapters to develop a framework for adoption and other key conclusions and recommendations. Finally, Chapter eight (Conclusion) presents a synopsis of the study and specifies its limitations, together with recommendations for further studies.

2.0 Fundamentals of E-government

Adding the letter *e* to any of today's practices has become the norm to describe a work performed electronically, so that *e* - electronic - now denotes use of the internet. Countries, businesses and individuals seek to integrate the internet into their day-to-day activities. Governments worldwide acknowledge the potential of the internet and ICT by offering efficient and effective public services, through e-government.

According to Hasan (2003), ICT offers three processes to promote governance:

- automation: computerising clerical functions
- informatisation: using information systems to support decision making and to enhance communications
- transformation: implementing new ICT-based information processes and process re-engineering.

E-government is not about implementing a new IT system only, but rather it aids to enhance and re-engineer work processes and systems for greater productivity (The Audit Office of New South Wales, 2001), (Kim et al, 2004). The Organisation for Economic Co-operation and Development (OECD) described ICT thus: "ICT needs to be incorporated into a package of modernization, organizational change and related reforms … that challenge public governance frameworks" (OECD, 2003). This chapter is one of two chapters (Chapters two and four) presenting the researcher's findings on literature describing the fundamentals of e-government and the barriers to its development and diffusion. Here, e-government's definition, scope, and applications are described along with examples of e-government projects and experiences from all around the world. Chapter four presents a more focused literature review investigating the barriers to the uptake of e-government and lessons learned for the Omani situation

from advanced nations' experiences in the same domain. The ultimate aim of both chapters is to understand and use the information available in the literature base to aid in the development and implementation of a successful e-government adoption framework for Oman. Basically, the researcher's conclusions regarding obstacles and solutions to e-government take-up from both developing and advanced nations' experiences are analysed to develop this framework.

The following section describes the basics of e-government, its definition, scope and applications.

2.1 Definition and Scope

Turban et al (2002) defines e-government as "the use of information technology in general, and E-commerce in particular, to provide citizens and organizations with more convenient access to government information and services …". This definition places ICT and e-commerce as vital components of e-government and emphasises the close relationship between e-commerce and e-government.

The OECD (2003) defines e-government as "the use of information and communication technologies, and particularly the internet, as a tool to achieve better government". In this description, the internet is defined as a requirement and a possible medium for e-government. It also emphasises that ICT and the internet should be viewed as tools for better government, not as goals to be achieved in their own right.

The World Bank (The World Bank Group, 2002) defines and describes the benefits of e-government as:

> *The use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other*

> *arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions."*

This definition explains different uses and the benefits of e-government. It also stresses that ICT, the internet and mobile computing are e-government tools.

From these definitions it can be concluded that e-government is a system that literally engages and covers every entity in its area of authority (i.e. citizens, businesses and public organisations). In other words, depending on the services offered, its scope includes everyone in its jurisdiction. In some instances, its scope can surpasses jurisdictional boundaries, where external services to people and businesses, such as tourism and foreign investment services, are provided. In addition, different levels of e-government may sometimes exist in larger countries like Australia and USA to accommodate for and simulate the different physical levels of government (i.e. federal, state and local). The conclusion is that e-government benefits extend to service providers as well as the target users. If e-government is properly designed and developed, it provides all stakeholders with a winning situation, enabling savings in time, cost and effort.

According to Moon (2003), e-government has four internal and external factors:

- establishing a secure Intranet and a central database to enhance interactions among governmental agencies
- developing web-based service delivery

- implementing e-commerce applications for more efficient transaction activities
- adopting digital democracy for more transparent and accountable government.

2.2 Applications

E-government offers services to those within its jurisdiction to transact electronically with the government. These services differ according to users' needs and ICT capacity, and this diversity has given rise to the development of different applications of e-government, described in the following subsections.

2.2.1 Government- to-Citizen (G2C)

Arguably, the majority of government services lie in this application, directed towards providing citizens and others with comprehensive electronic resources to respond to individuals' routine concerns and government transactions. With government-to-citizen (G2C) applications, the public organisations publish information and contact details, and offer regular services online. The ultimate aim of this application is to give users different options and communication channels for government transactions. An example of this is the Government Online (GOL) project in Canada that provides a client-centered service delivery across different delivery channels such as the internet, in person, and by telephone (OECD, 2003). The same source also describes another case in Spain, where the Catalonian government developed a public company called ".Cat" which packages projects and programs from different public sector agencies and delivers them via multiple channels through a .Cat portal (www.cat365.net) to citizens and businesses. More examples of this application are provided in section 2.5.1.

The best practice in e-government is to build systems that are designed to serve citizens' needs and life situations rather then simulating government departments

online. The National Office for the Information Economy (NOIE, 2003a), now the Australian Government Information Management Office (AGIMO), states, “Maximum value can be attained from citizen-centric e-government systems that follow life events, rather than being limited by agency boundaries.” A good example of such an approach can be found in Mexico’s web portal (www.gob.mx) that includes more than 1500 informative and transactional services from over 100 government institutions (OECD, 2003). Another example, Heeks (2002) describes a single Point Tax Payment System that was developed in Mauritius to allow taxpayers to lodge their income taxes.

2.2.2 Government-to-Business (G2B)

This is the second major application of e-government. Businesses as well as individuals have transactions with the government, examples being: renewing registrations, lodging taxes, downloading tenderers’ information, and many others. This e-government system also serves external business inquiries. Tourism portals are a good example of an e-government system that benefits both foreign and local businesses. According to OECD (2003), the Spanish government developed a web portal (www.spain.info) to use as a tourism portal. The portal gathers its information from different public and private sector databases. The portal has a multilingual facility, to help tourists, and locals to plan and book holidays and accommodation packages with local businesses online.

The government-to-business (G2B) application is as useful as the G2C system, enhancing the efficiency and quality of communication and transactions with business. Poon (2002) argued that G2B applications should be given the same focus and importance as those of G2C, and that governments should work closely with businesses to develop effective e-government systems. This avoids system incompatibilities, and benefits government from business’ online experiences in areas such as e-marketing

strategies. Moon (2003) shares this point and strongly recommends that state governments in USA try to establish strong collaborative relationships with vendors. Korea's procurement portal (www.g2b.go.kr) and Mexico's online procurement website (www.compranet.gob.mx) are good examples of this application (OECD, 2003).

2.2.3 Government-to-Government (G2G)

Many government processes and transactions require collaboration and inputs from different public organisations. For example in Oman, business registration forms require approval from several government ministries. The ultimate aim of the government-to-government (G2G) application is to enhance inter-government organisations' processes by streamlining collaboration and coordination (Huang et al, 2005). This application serves both internal processes and activities (between public organizations themselves) and external ones also (between government organizations, citizens and businesses). Collaboration between agencies is an important factor for seamless services but e-government coordinators should maintain a balance between the benefits of collaboration and the need to preserve accountability of the individual agencies (OECD, 2003).

Pizzella (2005) describes a G2G e-government initiative from USA (GovBenefits.gov) that maintains a network and coordinates inputs from many federal and state governments to help users find out their eligibility for various benefit programs. According to the same source, it currently includes over 400 federal benefits programs and over 600 programs from all fifty states.

2.2.4 Government-to-Employee (G2E)

G2E is perhaps the least adopted application of e-government. Scholars and countries around the world usually focus on the first three applications only; others

consider it as an integral part of G2G. Information and services offered by government institutions to employees and the channels by which employees interact with senior management are represented by G2E. Intranet systems developed inside government organisations are a good example of this form of communication. G2E is difficult to plan and implement and can be underestimated and under-resourced. Mahler and Regan (2003) argued that despite the user-friendly progress in USA's federal public websites, the government lags in the development of Intranets, and it provides few online services for its employees. Abramson and Marin (2003) see that G2E is gaining popularity, which will be a challenge to federal government in USA. Another possible hindrance to the widespread of this kind of e-government application is in the low number of targeted employees when compared to external citizens or business (Ho et al, 2005). Ho et al (2005) found that Hong Kong couldn't enhance the adoption rate for its G2E applications despite its success in the G2C and G2B areas.

E-government Unit (2004) described a good G2E example adopted by many government agencies in New Zealand. According to the source, the agencies are

- developing and improving their intranets to help in:
- providing tailored information to employees
- launching electronic document management system, and
- sharing data with other agencies.

In addition, some agencies are offering their employees mobile computing solutions to aid employees on the move to find information from the agency intranet (E-government Unit, 2004).

2.3 Advantages of E-government

The internet is ubiquitous. In the past, it was mainly used for educational and information sharing purposes (Schneider and Perry, 2000), but internet applications now facilitate day-to-day activities. E-government is an important application of the internet and is used by authorities to encourage broad use of computers and to facilitate communication and interactions with its institutions, citizens and businesses. Cutting red tape, enhancing the efficiency and effectiveness of the services offered and reducing costs for both users and the service providers are some of the aims and goals behind the adoption of this mode of service provision. Despite this, e-government should not be thought of as the solution for such inefficiencies but rather the tool that increases the urgency for such aims and ambitions (Atallah, 2001). NOIE (2003a) identifies e-government benefits as follows:

- improvement of service delivery and citizens' social welfare
- reduction of users' and organisations' time, effort and costs
- increase of users' ICT skills and knowledge
- creation of new business and work opportunities.

OECD (2003) thoroughly examined e-government initiatives in its members' countries (Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxemburg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, UK, USA), and listed the advantages of e-government as follows:

- improves efficiency in processing large quantities of data
- improves services through better understanding of users' requirements, thus aiming for seamless online services

- helps achieve specific policy outcomes by enabling stakeholders to share information and ideas
- assists a government's economic policy objectives by promoting productivity gains inherent in ICT and e-commerce
- contributes to governments' reform by improving transparency, facilitating information sharing and highlighting internal inconsistencies
- helps in building trust between governments and their citizens, an essential factor in good governance by using internet-based strategies to involve citizens in the policy process, illustrating government transparency and accountability.

2.4 Critical Issues in E-government

E-government's broad scope and complexity create many technical and non-technical issues that have to be closely monitored and controlled. Such issues are crucial to the successful implementation of effective e-government systems and therefore should be planned and examined carefully. Ranging from issues internal to the e-government system and others with external impacts, this study pinpointed the following vital concerns.

2.4.1 E-government Design and Development

Planning and control are perhaps the most important issues in e-government. E-government systems need rigorous planning to avoid partial or total failures, involving public and private parties to effectively control the design, development and integration processes. "The key question today is not whether organizations, including those in the public sector, have websites, but what is the quality of those sites and the scope of services currently being provided online." (Abramson and Morin, 2003). This source outlines other issues that need addressing to enhance the quality of services, such as

transparency (ensuring information about government performance is continually made more accessible), accountability and e-democracy. In this regard, the authors see that the focus would shift (after 2003) from basic deployment of IT applications to the possible implementation of e-governance, where the focus will be on citizen-centric development approaches. The point is to involve users not only in the design of e-government systems but also in designing the government processes, and other relevant political issues (*Note: Issues related to users are described in more detail in section 2.4.2*). Being more transparent, accountable and flexible with the general public will enhance user commitment and trust, and therefore increase their adoption rates of this form of government service delivery.

Funding is a major factor in the planning and development process. “Planners should be generous in estimating the time and cost of systems development and deployment” (Fulton, 2003). Johnson (2003) declares that web portals “should be designed, financed, developed, deployed and managed as a capital investment”. Cost minimisation should be avoided and a thorough finance and budget estimate process applied. According to OECD (2003), the UK government in 1998 created a Capital Modernization Fund to finance innovative ICT investments. Funding is allocated on competitive criteria and among the successful projects were many e-government initiatives.

E-government systems development is a complex matter, involving many crucial elements. Fulton (2003) emphasised that governments should develop systems according to their needs and requirements, rather than focusing on the latest technology. He declared “Systems development must be driven by the business needs, not by the hardware or software”. Collaboration and integration with other public and private organisations is also important to systems development. NOIE (2003) concluded that

integration is crucial to any e-government system. It also suggested that development activities such as public organisations' procurement of new or replacement equipment takes considerable time and effort and should therefore be planned very well. In this regard, Canada realised the importance of collaboration between government services. An initiative called Canadian Government Online (CGO) was developed to aid in the re-engineering and collaboration of the government services (OECD, 2003).

Griffin and Halpin (2002) point out another design issue. They argue that aggregating services from different parties around users' needs in one portal would produce a "Digital Intermediary". Digital intermediaries can be developed through a combination of different government services and also by interfacing services with the private sector. A good example of such combined services and collaboration between government and the private sector is the ESDLife project in Hong Kong. According to Poon (2002), ESDLife is a joint venture between the government of Hong Kong and a number of businesses. The government acts only as a user and content provider where the private organisations are investors and developers. The ESDLife portal hosts different services from different public and private organisations categorised around users' life events. Grouscos et al (2003) presented another development option that works as a one-stop shop for e-government services. He describes a real online cross-border business (www.cb-business.com) that acts as an intermediary hub and offers informational and transactional services that could be used by any public institution instead of initiating their own.

2.4.2 Targeted Users

Perhaps the most important external factor to the success of e-government initiatives is the user. Users' requirements are a vital component of the system's development phase, as they usually shape the layout and design of government portals,

and such involvement later insures user commitment. Fulton (2003) found that technology innovation occurred only when there was a relationship between developers and users. Online services should be selected and examined according to users' needs. The gap between supply and use of government electronic services should be minimised (Singh and Laidler, 2002) and e-government systems should be designed to be citizen focused (Poon, 2002). NOIE (2003a) states, "Maximum value can be attained from citizen-centric e-government systems that follow life events, rather than being limited by agency boundaries." This outlines a challenge for governments to determine which services, features and options to publish on their websites, aiming to develop high-functioning e-government portals (Gant and Gant, 2003). E-government is unique in this regard, compared to e-commerce applications, as the latter focuses on categories of e-commerce applications (e.g. B2C or B2B) within certain market segmentation, whereas e-government focuses on all categories and covers all segments of the society. Teicher and Dow (2002) stated that "Unlike businesses, which may choose to ignore some market segments, governments must attempt to serve all citizens on similar terms".

Many researchers realise the importance of users in building e-government. Zwane (2002) argues that governments should view their citizens as customers because e-government is not about technology; it is about people making e-government happen. "Governments must treat public first as citizens and then as consumers of government services (Alsawafi and Sridhar, 2003). Viewing citizens as customers means that governments should seek to satisfy the users' needs. Lin (2003) proposes three main scales to determine customers' satisfaction: first to know customers' needs, second to know customers' values and third to know customers' costs. Collinge (2002) urges

authorities to research their customer base carefully to prevent a possible e-government system that cannot attract sufficient online users.

2.4.3 Culture

The task of understanding users' needs requires consideration of the factors that shape those needs and how they differ from one user to another or from one society to another. These needs and expectations are heavily influenced by the culture of each user.

"Culture is difficult to study partially because it is not an easy concept to define" (Davison and Martinsons, 2003). Robbins (2000) defines national culture as "attitudes and perspectives shared by individuals from a specific country that shape their behavior and the way they see the world". Hofstede's seminal work in 1980 (Hofstede, 1980) opened the gate for researchers to examine his work and consider national culture for further research in different fields (Ford et al., 2003; Sornes et al., 2003). In Hofstede's early book (Hofstede, 1980); he identifies four dimensions, which categorise cultural patterns into: power distance, individualism-collectivism, uncertainty avoidance and masculinity-femininity. Low (2001) states that there are many definitions for culture, a cause of considerable confusion, but suggests that cultural familiarity is an essential project management skill. Chang (2002) identifies different determinants of culture: social structure, religion, language, education, economic philosophy and political philosophy.

The Commonwealth Telecommunications Organisation, (2002) argued that e-government systems need solid planning and vision, that IT should be viewed as the means not the desired end, and importantly, it should match the local environment's culture, values and needs. On the other hand, Weisinger et al (2003), argue that culture should be viewed as people's behaviour rather than people's thinking. They present

many examples of cross-cultural IT management conflicts and draw the following implications:

- goals can be accomplished by formal means in one culture and informally in another
- essential IT management practices in one culture can be viewed offensive or unnecessary in another
- IT management practices accepted in one culture can sometimes be used to solve IT management problems in another.

2.4.4 Infrastructure

E-government infrastructure is another crucial issue that can sometimes be costly to build and manage. Infrastructure construction can be outsourced to alleviate the heavy finance burden on governments but this can be the least preferred option for some governments that prefer to retain control of internet development and the internet flow of information (Huff, 2001).

Security and online legislation, which could be considered as basic infrastructure requirements, are also important factors for e-government. “If implemented properly, security is a way of life (Heiman, 2003)”. Governments must ensure high security in their websites in order to earn users’ trust and continuous willingness to use the services. For instance, 32 per cent of 395 IT professionals interviewed in USA claimed that most e-government programs are not adequately secured against external misuse, a factor that negatively affected adoption rates (Dix, 2002). Legislation pertaining to online transactions and business activities is also crucial. France is a pioneer in establishing such legislation. According to OECD (2003), on the 6th of January 1978, France developed a law that recognises security and privacy rights for individuals in the automatic processing of personal data by either the public or private sector. This legislation grants the right for individuals and organisations to demand information and

access to any of the person's private data, either directly or indirectly, to be able to rectify faulty data, to refuse permission for storage of data if permitted by law, and to choose to be erased from the system also as permitted by the law.

2.4.5 E-readiness

A society's e-readiness is another issue that should be closely planned and measured to ensure that e-government systems are used by the majority of potential users. Alsawafi and Sridhar (2003) point out that "E-government vision requires a community that is information and technologically literate to access the information they require." Bui et al (2003) define e-readiness as "the aptitude of an economy to use information and communications technologies to migrate traditional businesses into the new economy." According to the same source also, e-readiness can be measured by eight main factors:

- knowledgeable citizens
- skilled workforce
- macro economy
- digital infrastructure
- industry competitiveness
- culture
- ability and willingness to invest, and
- cost of living.

This emphasises the importance of measuring the society's e-readiness as part of a government's main IT strategy, and to construct a profile of those segments of the community that are more likely to be able and willing to use online systems and ICT in general.

In addition, continuous e-government monitoring is crucial to identify minor defects before they can cause a major failure. Government policy makers measure e-commerce and e-government performance worldwide, with the OECD working to provide measurement indicators for e-commerce readiness (Working Party on Indicators for the Information Society, 1999). Despite OECD's massive effort, it has been argued that its readiness indicators are very much technically oriented (Deiss, 2002). De Graaf and Muurling (2003) extend OECD's readiness framework to include mindset indicators that describe the attitudes of stakeholders toward e-commerce. These indicators are an initial attempt to address the effects of cultural factors on e-commerce.

2.5 Worldwide E-government Experiences

Many e-government systems have been adopted around the globe. Advanced nations as well as developing countries are seeking best practice solutions to build effective systems. Despite these efforts, major problems confronting e-government developers – described in detail in chapter three - resulted in many projects experiencing total or partial failure. This section describes the e-government initiatives of several governments. It begins by presenting experiences from advanced nations and then moves to projects from the Arab world. The ultimate aim is to identify factors and lessons that may assist e-government adoption and dissemination and survey the development strategies used.

2.5.1 Experiences with E-government

Australia:

Some Australian e-government instances follow NOIE (2003):

- E-tax (ato.gov.au): was launched in 1997 by the Australian Taxation Office (ATO) to help taxpayers to prepare and lodge their income tax returns. It assisted in the

reduction of the ATO's processing time from 8 weeks to 2 weeks and reduced its costs by a million dollars Australian per year for five years.

- Centrelink (www.centrelink.gov.au): is a government agency that represents 20 public agencies in Australia, servicing over 6 million people. Centrelink launched an online system at a cost of AUD$600,000 in 2001 to facilitate communication with users. The system provided convenience and timesaving for its clients and Centrelink's transaction savings amounted to AUD$5 millions over three years.
- Job Search (www.jobsearch.gov.au): is an online employment services system that was introduced in late 1996 by the Australian Government's Department of Employment and Workplace Relations. The system provides national exposure to job vacancies and is offered through the internet and over 2400 touch screen kiosks throughout Australia.
- E-visa (www.immigration.gov.au/e_visa): is an online system launched in December 2000 by the Australian Government's Department of Immigration and Multicultural and Indigenous Affairs to enable people around the world to lodge visa applications online. Only low-risk countries' citizens can use this feature and they can pay fees, receive email notification and download medical forms online. Even during peak times, the system can deliver standard visa approvals in only 20 minutes from the time of submitting application.
- Business Entry Point (www.business.gov.au): was developed by the Department of Industry, Tourism and Resources in Australia to act as a one-stop-shop for businesses. It enables business to register and acquire an Australian Business Number in addition to performing more than 2900 different transactions with government agencies, including information about tenders.

- E-filing (www.efiling.fedcourt.gov.au): was created by the Federal Court of Australia in October 2000 to enable litigants and the general public to lodge case applications and supporting documents online. It helped to cut travel time for people from rural areas and acted as a good example for the promotion of the court's and the country's image in general as an "advanced high tech place to do business in".
- Commonwealth Electronic Tender System (www.tenders.gov.au): was first published in June 2002 with eight participating agencies, and more then 140 by end of 2005. It allows agencies to advertise their 'Request for Tenders' and enables users to submit responses online through a secure tender process.

AGIMO (2003) has many Australian case studies of e-government systems that mainly provide information. Examples follow:

- Australian Bureau of Statistics (www.abs.gov.au) offers statistical data and indicators on an annual subscription basis.
- AskNow! (www.asknow.gov.au): is managed by the National Library of Australia. It is an online reference chat service that enables librarians to reply to people's inquiries in real-time.
- Radar e-Service (www.bom.gov.au/weather/radar/): is maintained by the Bureau of Meteorology. It provides users with information of current weather, which is updated every 10 minutes. It offers a radar e-service that records about 6 million hits a day.

Austria:

According to Rupp (2002), the eAustria portal that contains both e-government and e-business elements, was established in 1994 by the Austrian Chamber of Commerce. Government organisations can access the portal through an Intranet system where private sector businesses have extranet access. The portal also provides

information about Austrian products in 19 languages and business information on other countries. The researcher also described other Austrian e-government initiatives:

- eJob-Room similar to the Australian Job Search project previously described, providing employment services online
- the Electronic Legal Communication (ELC) that handles communication and transactions between courts and different parties
- the Administration Gateway of the City of Salzburg that manages tax payments online
- the national Austrian government e-government portal named HELP, designed for its citizens needs such as marriage licences, passports, and childbirth registrations.

Hong Kong:

Hong Kong has a uniquely designed and implemented e-government model that combines public and private elements in a citizen-oriented approach. Poon (2002) describes the ESDLife initiative in Hong Kong as a joint venture between the government as a contents provider and private organisations as Electronic Service Delivery (ESD) providers in the one portal. Poon reports that this initiative places the Hong Kong government as a user rather than an owner of ESDLife, which results in the following advantages:

- less implementation difficulties as the system development and equipment procurement responsibility is shifted to the private sector
- government services are placed with those from the private sector, which enable users to access both at the same time
- the system was developed according to the commercial interoperability standards, eliminating the public-private sector interaction implementation phase.

Poon adds that the staged system implementation enabled developers and the government to manage customer expectations and measure users' patterns successfully.

Italy:

According to OECD (2003), the Ministry of Economy and Finance in Italy began an e-procurement initiative in 2000, including an online product catalogue, e-auctions and e-marketplaces. This initiative required legislation to introduce the system. However, it reduced the cost of government procurement by 30 per cent. In addition, Italy adopted a procurement strategy for IT products such as office equipment, software and web pages to meet the accessibility requirements for people with sight or hearing impairments and the portal is monitored on this policy.

Denmark:

As a part of the 2002 economic agreement between Denmark's government, its regions and some local authorities, a public health portal has been established to increase the efficiency of the healthcare system (OECD, 2003). Patients now have electronic means to communicate with their doctors regarding e-appointments, email consultations and repeat prescriptions. This portal integrates hospitals, clinics and general practitioners in regard to examination information. This initiative has high-level security measures and policies to protect patients' privacy.

Japan:

Japan is a good example of governments that focus on disabled citizens' access to their e-government portals (OECD, 2003). It has developed guidelines for website developers to facilitate disabled people accessing government's websites by converting the web content into many forms such as sound and images. Despite this, Japan was initially slow in adopting e-government concepts (Jain, 2002). According to this source, an e-Japan strategy was launched in June 2001 outlining guidelines and tasks, and

allocating budgets for different projects. A comprehensive government portal (www.e-gov.go.jp) was established in April 2001 to connect all government homepages and provide single point of entry to access all online services (Jain, 2002).

New Zealand:

According to E-government Unit (2004), government agencies in New Zealand are utilizing the internet to offer wide range of information and services to the general public. The same source outlines that a single government portal (www.govt.nz) was developed to connect users to all government agencies' services and information, achieving connection between more then 300 agencies with over 1500 online services. The source has also categorized the top performers in e-government such as the Inland Revenue (www.ird.govt.nz) that provides tax information and services to users similar to the e-Tax initiatives in Australia, and Statistics New Zealand (www.ird.govt.nz) that offers comprehensive statistics and indicators of many aspects of the country.

Singapore:

According to Ke and Wei (2004), Singapore's government portal (e-citizen) initiative is achieving an annual saving of $14.5 millions to the government. The source also outlines that Singapore was able to offer 92 per cent of its services online by end of 2001. The hits of the e-Citizen portal increased dramatically since 2001 of 240 thousands hits a month to 14.4 million hits per month in 2003 (IDA, 2005). This source also describes a nation-wide personal authentication structure called SingPass that allows residents above 15 years old to transact online with all government e-services using a single identification and password. Businesses can also transact conveniently with the government using the G2B portal (IDA, 2005a). According to the same source, businesses can utilize the portal to incorporate new companies, submit building plans and to set new entertainment outlets.

Sweden:

Sweden presents an example of international partnership combined with efficiency: The Nordic "Green Corridor" system originally developed by the Swedish customs office (OECD, 2003). At the national point of entry for an import consignment, it enables Swedish, Finnish and Russian customs officers to check online for the trader's customs declaration - which can also be submitted online. The process is assisted by special measures such as digital signatures to ensure the authenticity of online information. This international cooperation facilitates customs documentation processing and assists export-import traders.

Switzerland:

Switzerland's e-initiative "Live+" (www.parlimanet.ch) is a good example of transparency in governments (OECD, 2003). It was launched in 1999 to allow citizens inside and outside the country to use the internet to watch live debates of the National Council and the Council of States of the United Federal Assembly. The Swiss Parliamentary Services developed the initiative in association with Swiss TV, and the site allows citizens to view a schedule of sessions and the official bulletin of the federal assembly.

United Kingdom:

The office of the e-Envoy was established in 1999 as part of the UK's prime minister's delivery and reform team in the cabinet office (Office of the e-Envoy, 2005). It aims to provide all government services through the internet by 2005. Some of the key initiatives of this project are:

- e-Democracy (www.e-democracy.gov.uk): aimed at utilizing new technology to increase British people's awareness and participation in local decision making

- Government gateway (www.gateway.gov.uk): was first introduced in 25 January 2001 (Office of the e-Envoy, 2005a) to enable users and organizations to register for online government services. The gateway features open standards that enables different government departments with different systems to communicate with each other through the gateway.
- Directgov (www.direct.gov.uk): is the main UK government portal that provides directory information and transactional services to the general public. Users are able to search for services either by audience groups such as disabled or by topics like tax.

United States of America (USA):

Many e-government initiatives have been developed in all levels of the government in USA. The following are a few examples from the federal level:

- Firstgov.gov (2005): is the official internet portal for the US government. It provides a single point of entry to all US government services and allows users to search by government levels (federal, state, local) or user type (citizens, business, government, federal employees).
- Business.gov (2005): enables small businesses to interact better with the federal government through the provision of valuable information about government rules and regulations, and online transactional services.
- GovLoans.gov (2005): is a single entry point to all US government loans developed by five major federal agencies. It aims to direct users to the federal loans that best suit their needs. There are mainly five types of loans: agriculture, business, education, housing, and veterans.

2.5.2 E-government Experiences in the Arab World

Oman shares many characteristics with other Arab countries in general and the

Gulf States in particular, such as culture, religion, language and history. With an aim to study and analyse such experiences to learn valuable lessons for the Oman situation, this section describes few e-government examples from the Arab world.

Bahrain:

E-voting was introduced in Bahrain during 14-15 of February 2001, with more then 200,000 voters participating in a referendum with options to express views and opinions on certain issues (Kostopoulos, 2003). The voters' Central Population Registration Card was used to identify voters, which features optical recognition – two ways bar code scheme that holds large information about voters. According to Al-Amer (2003), a central population register database was established in 1984 that holds information of people, land and establishments. The source also outlines that a government data network was developed in 1996 connecting all ministries in Bahrain and service shared resource applications. Nair (2004) stated that e-investor; an ongoing project with Microsoft is expected to be launched soon to act as a one stop shop for all investors' needs. The source outlined that this project has two components:

- G2B which processes and collaborates investors' requirements with different government agencies
- G2G that links the different public agencies together.

Egypt:

Heeks (2002) presents examples of African e-government initiatives. In Egypt, a computerised decision support system was developed to reform customs tariffs processes, which aimed to resolve conflicts between involved ministries. In addition and according to e-Government Program (2004), a government portal (www.egypt.gov.eg) was established offering 19 online services at the moment to individuals and businesses. Users can request and pay for birth certificates and national ID cards online and receive

them in the mail (e-Government Program, 2004). The source also notes that Giza region residents can now renew and pay for their driving licenses online. Business can also find useful information and tools regarding taxation and tariffs as well as inquiring about utilities bills (e-Government Program, 2004).

Jordan:

According to Ciborra and Navarra (2005), Jordan is working fast and hard to become the Singapore of the Middle East in adopting ICT to offer government services online. Currently, Jordan still lacks a payment gateway to process credit card kinds of payments (Al-Qirim, 2004). According to USAID (2005), Jordan only started planning seriously for e-government in 2003 when the Program Management Office was established under the Ministry of Information and Communication Technology. The same source outlines that the office was able to achieve 13 e-government initiatives and 30 separate related projects within a year, including developing an e-government operations center, linking a number of ministries to a secure government network and email, and building many online services such as company registration and income tax filling.

Kuwait

According to Kostopoulos (2003), the Kuwait government and FAPCO (a local private company specialised in software solutions) are working collaboratively to develop a comprehensive portal to the state of Kuwait, available in many languages and including varied information about Kuwait. This site is planned to include much information about the e-government project and to act as a gateway to all government e-services (CTB, 2005). According to this source, currently users can utilize the portal to enquire about their civil ID number, renew their smart national ID card and register companies in the ICT field. Kuwait has also signed a Memorandum of Understanding

with Singapore to aid in assessing and developing its e-government plans, requirements and collaboration (Shuhaibar, 2004).

Qatar:

Qatar's first online service was launched in July 2000 allowing residents to renew their permits (Almahandi, 2004). In 2003, an e-government portal for the state of Qatar was developed with a few online services (Qatar Gov, 2003). According to the source, people in Qatar can now renew, report and replace lost and damaged driving licenses. The individual can later either collects his / her new license from the Traffic department at no extra cost or have it mailed to him/her for an additional cost. In addition and according to the same source, individuals and businesses can check for traffic violations on their fleet of cars online and lodge payment securely online as well. Besides, people are also able to use the same portal to select and pay for Zakat and different kinds of donations (Qatar Gov, 2003a).

In January 2004, the Qatar government launched a new e-Employment service (Qatar Gov, 2004). The new employment service offered through the portal allows Qatari people to submit resumes and browse through job vacancies and employers to search through job seekers information and invite prospects for interviews. In addition, according to Qatar Gov (2004a), people and businesses in Qatar now can view and pay their monthly utility bills online.

Saudi Arabia:

An initial extranet effort between Ministry of Hajj and other tour operators organizing pilgrims' needs has further been developed to cover other related activities such as visas and accommodation reservations (Kostopoulos, 2003). The Saudi Arabia e-government readiness position has improved by 15 points since 2003 (UNPAN, 2004, 38). The same reference illustrates that, despite the current absence of a national portal

or website, many ministries have established an online presence providing informative websites such as ministries of health (www.moh.gov.sa.), labor (www.mol.gov.sa), and education (www.moe.gov.sa).

United Arab Emirates:

The leading example of e-government initiatives in UAE can be found in Dubai (Kostopoulos, 2003; Alshaer, 2003). According to the latter source, the Dubai government was able to deliver more then 600 online services to people and businesses in the three years times since 2001. The crown prince of Dubai launched his own website to facilitate communication with his people (Kostopoulos, 2003). In addition, this source describes that tourist visa applications can now be filled in online, motorists can scroll through many kiosks scattered around shopping malls for traffic violations, receive (if registered) up-to-date traffic reports via short message services (SMS), and access the police department wireless application protocol (WAP) site using their mobiles for locations of the nearest police stations and other services. Kostopoulos (2003) also described an e-currency system adopted by the Dubai government (m-Dirham) where people deposit money in a third party financial institution and later use that account to pay for different municipal services. Sun Microsystems open standard platform was used for Dubai's portal development and deployment (Sun Microsystems, 2005).

2.6 Summary

This chapter examined the literature to define and illustrate the scope, applications and advantages of e-government. Examples of e-government projects from advanced nations such as Australia, UK and USA as well as initiatives from the Arab

world have been presented. Moreover, critical issues pertaining to the development and dissemination of e-government in general have been described also.

It is clear that e-government has many advantages to offer to all arms of government. Despite this, many critical issues must be faced in the adoption and diffusion of e-government, most of which are non-technical in nature with wide impact and require thorough planning. Advanced nations in addition to developing ones are struggling to cope with and tackle such factors. Consequently, this study aimed to investigate primarily non-technical barriers to the adoption and diffusion of e-government and propose solutions. In the next chapter (Chapter three: Research Design), the scope, questions, architecture and design of the study are illustrated. In addition, data collection methodologies and the adopted strategies for data analysis are presented.

3.0 Research Design

This chapter details the research design and procedures adopted throughout the project. According to Yin (1994), the research design is "the logical sequence that connects the empirical data to a study's initial research questions and, ultimately, to its conclusion". In the same way as Bouma (1996) recommends, the selection of a research design and methods for this project aims to answer the research questions and meet the research objectives (Bouma, 1996).

This study follows what Creswell (2003) defines as "sequential procedures, in which the researcher seeks to elaborate on or expand the findings of one method with another method". The same source also clarifies that "the study may begin with a quantitative method in which theories or concepts are tested, to be followed by a qualitative method involving detailed exploration of a few cases or individuals". This is exactly the general approach of the study. This research commenced by defining theoretical concepts and aims through a general literature search, developed a quantitative survey instrument to test and review such concepts on a focused sample, and finally conducted qualitative interviews to refine and elaborate on the quantitative results.

The following sections describe in detail the research structure, activities and outcomes. It starts with a general overview of the research design, follows this with a detailed description of the chosen data collection strategies and finally illustrates the methodologies used for data analysis.

3.1 Overview

As stated earlier in chapter one, this project aimed to understand the behavioural

attitudes within Omani society towards the adoption of e-government. It pointed toward uncovering the non-technical and country-specific barriers that might obstruct Oman's adoption and dissemination of e-government. The focus was on Oman e-government initiatives to identify possible obstacles, and on advanced nations' experiences in the same domain to draw some valuable solutions to and lessons for the Omani situation.

The project commenced with a general literature search process focused on key concepts from the following areas: information systems; technology management and diffusion; change management; the national culture-technology interface; and of course, e-commerce and e-government. The initial findings helped to set and refine the study's aims, scope and the research questions. A more focused literature search was carried out on advanced nations such as Australia's and other Western countries' e-government experiences in order to identify possible lessons for and solutions to barriers facing the take-up of e-government. In parallel, an exploratory case study of the Oman e-government project was conducted that aimed to test the extent to which the barriers and solutions drawn from the largely western-centric literature apply in the Omani situation, and to investigate other possible cultural and country-specific barriers. A related aim was the development of a prescriptive, socio-technical e-government take-up framework, which might be used to guide the implementation of e-government initiatives in the Arab world in general and in Oman in particular. The essence of this framework (described in detail in chapter seven) is the barriers and solutions to e-government take-up identified and refined during the literature review and case study, and relationships between these.

Semi-structured interviews and face-to-face administered questionnaires were the primary data collection strategies used throughout the case study phase. Essentially, the literature review has led to the development of a survey instrument and interviews

were employed to refine, elaborate upon and expand survey results. Participants were chosen randomly according to pre-defined criteria (described in section 3.3.2.1).

Qualitative and quantitative methodologies were used to analyse the data gathered from interviews and surveys respectively (chapter six). The questionnaires were used to draw a profile of those Omanis most likely or least likely to use e-government initiatives in Oman. They were examined to define variables and relationships using basic statistical techniques. Interview results were used to refine and

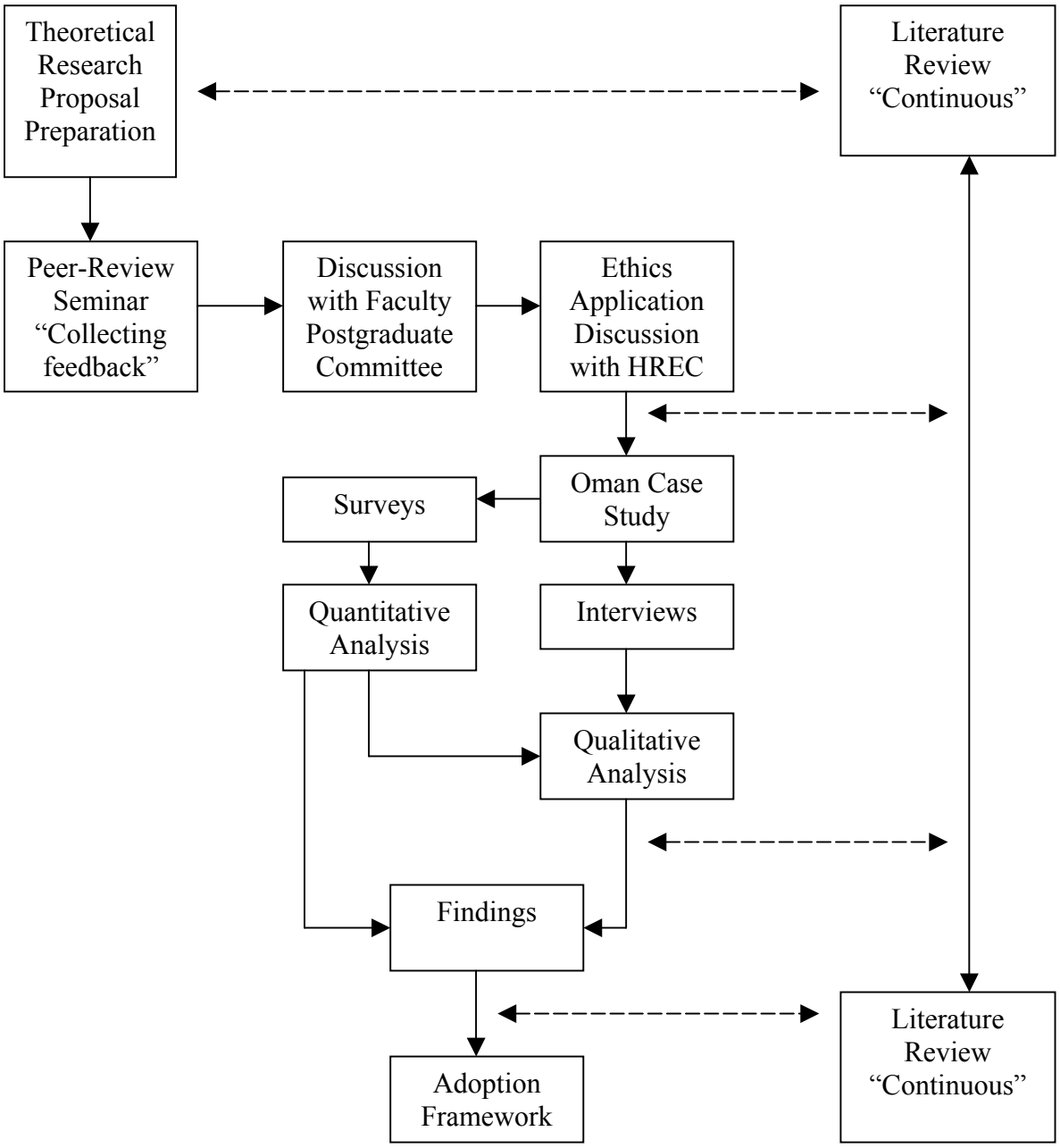


Figure 3-1: Research design activities and outcomes

supplement these profiles, and elaborate on the possible barriers to the uptake of e-government in Oman.

The research design is illustrated in Figure 3.1. It shows that the literature review was an ongoing process that aided in concluding major project milestones such as the research proposal, case study instruments and adoption framework. It also depicts all the administrative processes undertaken before carrying out the research data collection stage (Oman case study), such as the peer-review seminar and the ethics application.

3.2 Research Questions

The study aimed to answer the following research questions:

- *What are the major barriers to the uptake of e-government in Oman? And what are the possible solutions (if any)?*
- *Are there any cultural, national or country-specific factors that might obstruct the adoption and dissemination of e-government in Oman?*

It tried to investigate another related question:

- *What lessons may be learned for the Omani situation from the Australian and other advanced nations' experiences with e-government?*

In particular, the study pointed toward the general barriers (technical and non-technical) to e-government adoption and dissemination in Oman. In addition, it strove to investigate any possible cultural and other country or regional-specific obstacles to the uptake of e-government in Oman. A segment of Omani society was investigated (defined later in section 3.3.2.1 as a possible target for e-government initiatives) to describe possible variables and factors in e-government take-up. A group of officials in the public and private sectors was interviewed to gather their perceptions, plans,

achievements and problems encountered in the development and dissemination of e-government initiatives in Oman.

3.3 Data Collection Strategies

The study used multiple data collection strategies as described by Denzin and Lincoln (1994) "The use of multiple methods, or triangulation, reflects an attempt to secure an in-depth understanding of the phenomenon in question". Leedy (1997) defines triangulation as "the process of using multiple data collection methods, data sources, analysts, or theories to check the validity of the findings". Particularly, this study followed the three principles of data collection as defined by Yin (2003), viz:

- using multiple sources "triangulation"
- creating a case study database
- maintaining a chain of evidence

Several data collection techniques were used throughout this research as described earlier. Figure 3-2 illustrates the research database structure, which depicts how the project maintained a chain of evidence by keeping track of several data collection artifacts. The database contains all documents gathered (i.e. government reports and publications, questionnaire template, completed questionnaires, interview templates, written indexed interviews, and interview tapes). The chain of evidence was maintained through a series of logical artifacts. As Figure 3-2 shows, the study has set off through a general literature search, which contributed to a more focused literature review, and in developing a questionnaire and interview templates. Consequently, data were gathered using these instruments and analysed to reach the ultimate conclusions of the study.

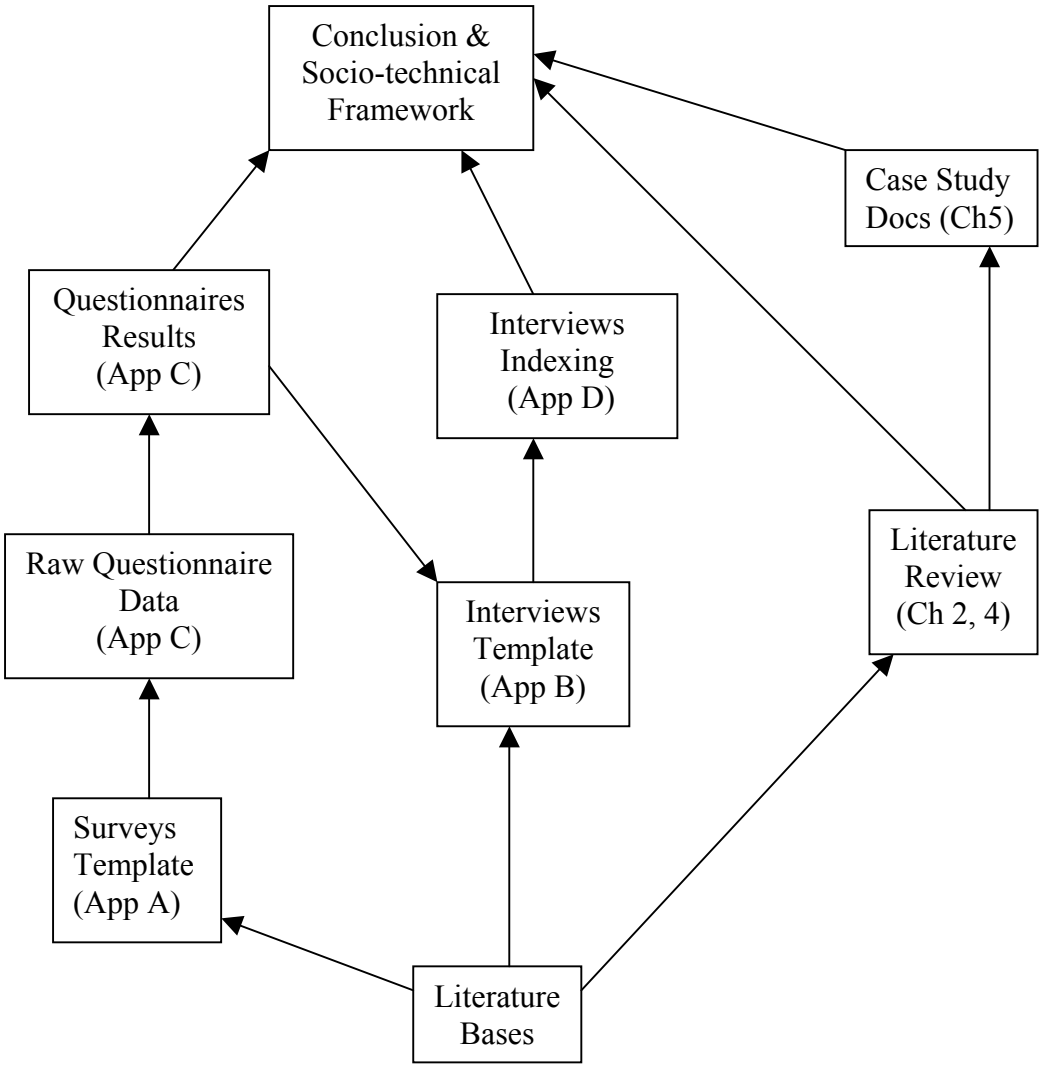


Figure 3-2: Broad research database structure

The study has strived to maintain a chain of evidence throughout the study by performing the following tasks, which meet Yin's (2003) guidelines:

- Citation between concluded outcomes and evidences in the database were developed and maintained throughout the whole thesis.
- Documentation and organisation of collected data within a database were implemented and sustained for easy retrieval upon any possible inspection.
- Continuous links and reference to the study's initial research questions in all aspects of the study were achieved and implemented as a signpost leading different sections of the thesis to the central aims.

The following sections describe in detail the data collection strategies adopted.

3.3.1 Literature Review

A continuous literature review activity was conducted throughout the whole project. At first, the focus was on issues pertaining to the following aspects:

- barriers to e-commerce, and especially e-government diffusion;
- cultural and other country-specific barriers to e-commerce or e-government diffusion; and
- proposed solutions to these barriers.

At an early stage, the information gathered was used to develop a theoretical research proposal highlighting the research aims and questions. Later and in parallel to the case study phase, a focused literature search was conducted on e-government experiences worldwide. Advanced nations such as Australia, UK and USA were surveyed for valuable lessons, conclusions and solutions to e-government take-up. Literature on e-government experiences in the Arab world was searched also to extract useful comparisons with and conclusions about Oman's e-government initiatives. Information gathered through the literature review was used to narrow down the project scope and refine the research questions. They were utilised too in building and enhancing the questionnaire draft and the sets of interview questions.

3.3.2 Case Study

According to Myers and Avison (2002), case studies are a common method for data collection in the field of information systems. Gall et al. (1996) define the purpose of case studies as follows: "…researchers generally do case studies for one of three purposes: to produce detailed descriptions of the phenomenon, to develop possible explanations of it, or to evaluate the phenomenon". The study aimed to describe the current and future plans and achievements in the Oman e-government project. It also

endeavoured to define, examine and explain societal and country-specific barriers to e-government adoption in Oman. Finally, it aimed to evaluate advanced nations' experiences in e-government to provide lessons for the Omani situation.

Oman's case study is the core element of the research. The case studied was Oman and the phenomenon was e-government adoption and dissemination. The ultimate focus was placed on studying and addressing barriers to Oman's e-government take-up. Part of the case study involved gathering information from different segments of Omani society to help describe the present and future plans and achievements in the same context. Interviews were also conducted with high government and private-sector officials to survey perceptions and attitudes to e-government adoption from the decision makers' point of view. Finally, questionnaires were distributed to various citizens of Omani society who represent the most likely targeted users for e-government. The following sub-sections describe the pivotal steps undertaken during this phase.

3.3.2.1 Sampling

According to Leedy (1997, 219), "…the two elements that are more important than any others in survey research are randomization and bias", and "…the descriptive survey method demands that the researcher select from the general population a sample population that will be both logically and statistically defensible". In addition, Bryman and Cramer (1990, 99) argue, "…researchers should strive to create as accurate as possible a representative sample of the general population or case of study, and that such sample if planned precisely will highly increase the external validity of the research". This study has taken these points seriously in defining the sample for investigation. The sample was first narrowed down from the general public of Oman to a more focused segment of the society. The aim was to define criteria for users that are most likely to benefit from e-government services—at least in the early stages.

Participants were chosen randomly from the focused segment of Omani society and the criteria were used to refine the sample. This process is known as *Stratified Sampling* according to Bryman and Cramer (1990), who defined it as follows: "…the researcher divides the population into strata. The strata must be categories of a criterion." The following paragraph explains the rationale for this approach.

Oman joined the internet in January 1997. It only has one internet service provider, Oman Telecommunications Company (OmanTel). By October 1997, the number of internet subscribers reached 6,000 and in 2003 it was estimated to be 20,000 subscribers compared with the total population of 2,478,000 (Ministry of National Economy – Oman, 2003). Only a few people in Oman currently subscribe to the internet and the internet penetration rate is relatively low. One obvious restriction to the widespread use of the internet in Oman is internet access cost. In Oman, it costs almost AUD0.78 per hour for a dial-up connection; that is, AUD18.72 a day "24 hours" and AUD131.04 a week "24/7" (OmanTel, 2003). Accordingly, educated people with reasonable income in Oman are the primary users of the internet and most probably the targeted users for e-government in Oman. The education factor was seen as significant simply because surfing the internet requires a fair level of computer literacy, which can only be obtained with at least a moderate level of education. The income factor was important because of the current high computer and internet levies in Oman.

Consequently, only those people who obtained a fair level of education with reasonable income were chosen to participate in the case study phase. Other segments of Omani society were omitted simply because they cannot benefit directly from the current e-government services offered, nor are they able to provide clear judgment and evaluation of the phenomenon investigated. These were the criteria set for survey participants. Organisations from the private and public sector were contacted before

distributing the surveys to gain access and support. Only those organisations that offered the greatest support to the research were chosen, and contacts were arranged within those organisations to help in the distribution and collection of the questionnaires. Accordingly, and giving the exploratory nature of this research, a survey sample size of 140 Omani citizens was chosen as follows:

- 20 junior government officials from the Oman Tender Board and Ministry of Commerce and Industry
- 20 junior private sector employees from National Bank Oman and Petroleum Development Oman
- 20 university lecturers from Sultan Qaboos University the only university in Oman
- 40 senior university students from Sultan Qaboos University
- 40 secondary school students from one secondary school in Muscat.

Interviews were conducted with key staff in the government and private sector organisations. These organisations were chosen according to their respective experiences in e-government and/or e-commerce. The active adopters of IT technologies were chosen and their key staff were interviewed. Key staff were chosen according to their job titles and responsibilities. Only those who make IT and strategic decisions were interviewed. Accordingly, interviews were conducted with the following government officials:

- Undersecretary of Ministry of Commerce and Industry for Commerce and Industry
- Undersecretary of Ministry of National Economy for Development Affairs
- General Manager and Head of Information Systems Department of Muscat Municipality
- Head of Computer and Information Systems Department of Ministry of Civil Service

- Head of the Information Technology Task Force and Computer Advisor of Ministry of Finance
- Head of Internet and Electronic Services Department of Royal Oman Police
- Manger Responsible for Civil Status System of Royal Oman Police
- Head of Computer and Information Systems Department of Ministry of National Economy.

From the private sector, the following officials were chosen and interviewed:

- Head of Internet and e-commerce Division, Bank Muscat
- Head of e-commerce Division, Oman TradaNet
- Manager responsible for Smart cards and e-services, Oman Arab Bank
- Manager responsible for SAP application, Petroleum Development Oman
- Manager responsible for SAP maintenance, Petroleum Development Oman

3.3.2.2 Interviews

The ultimate aim of interviews was to survey the perceptions, plans, achievements and barriers encountered in e-government from the decision makers' point of view in Oman. It aimed also to review current progress and planned future activities for Oman's e-government. The results of these interviews were used to supplement the questionnaires' results.

Semi-structured interviews are valuable for comparison and require less in the way of interviewing skills (Kumar, 1996). This type of interview was chosen for the Oman case study phase. A fixed set of questions was developed to facilitate the process of estimating the time needed for the whole interview. This aided in acquiring access and appointments with interviewees since the list of questions was required to be attached to the research invitation letter to help in estimating the scope of the interview

to the participants. It was also necessary to indicate the time frame of the interview when making appointments.

Only semi-structured interviews were conducted with high-ranking officials in the public and private sectors in Oman. Interviewees were chosen according to an initial survey and assessment of e-government progress in Oman. As indicated earlier, active organisations in the e-government and e-commerce fields were identified in the public and private sector respectively. This is due to the fact that these institutions are in a better position to provide details and insight on barriers to internet electronic applications such as e-government and e-commerce. Key officials were chosen from these organisations to provide the needed information. These people were chosen according to their job title and the degree of their organisations' experience in electronic services provisions. Access to these key people was coordinated through various contacts in the relevant organisations. The contacts were arranged and contacted through formal means before the data collection phase started. Official invitation letters were issued from the Ministry of Higher Education (as always required for any academic survey in Oman) to support and facilitate access to the key people.

3.3.2.3 Questionnaires

A questionnaire template (see Appendix A) was developed with the research questions in mind, "Developing the questionnaire operationalises the research questions" (Punch, 2003). The study followed Leedy's (1997) four practical guidelines in developing the questionnaire draft as follows:

- using clear language
- meeting research aims
- planning development, sample, distribution and collection
- creating a solid cover letter

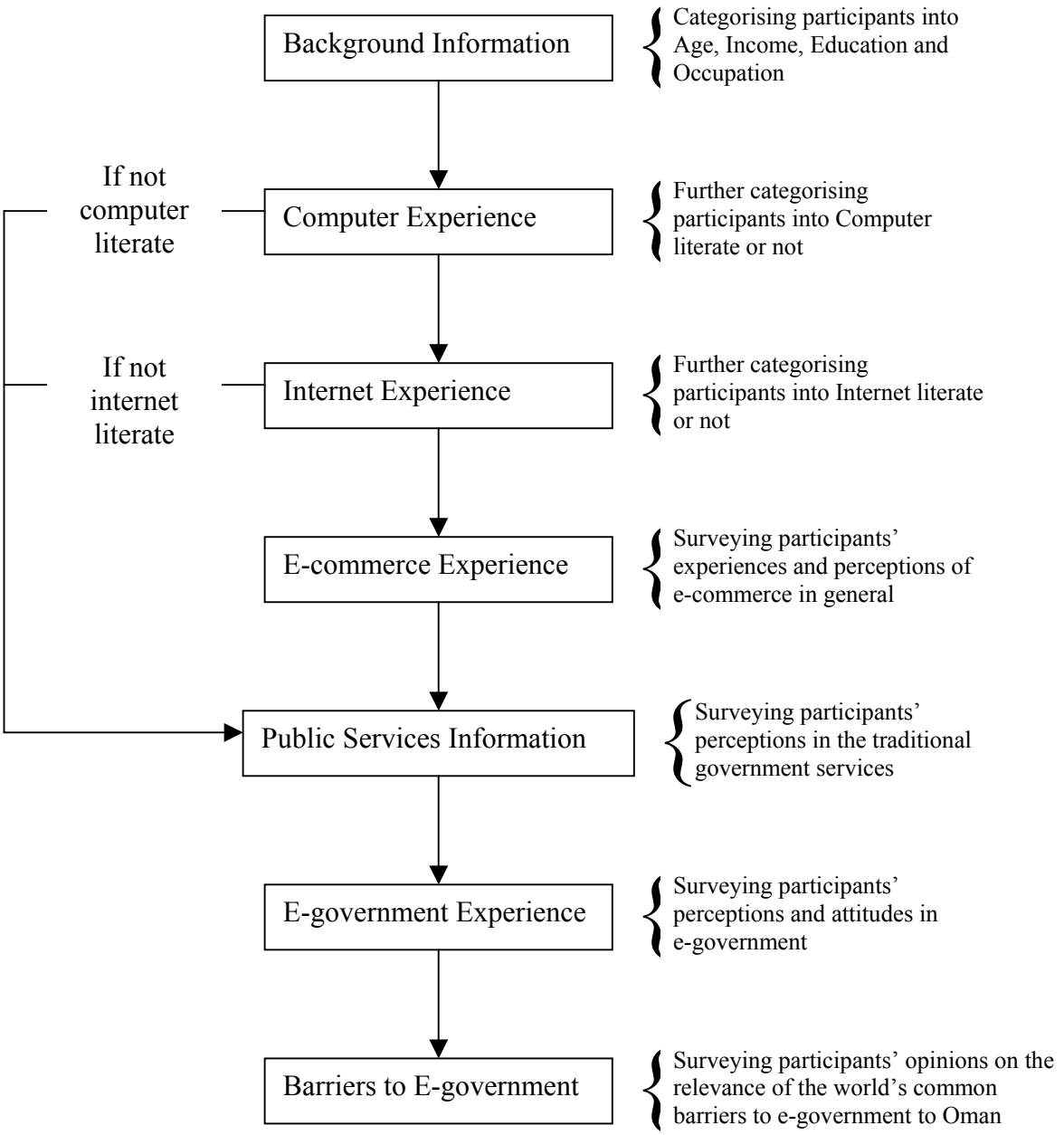


Figure 3-3: Questionnaire structure

Simple English was used with definitions provided in many instances, and an Arabic version was developed for non-English-speaking citizens. In addition, the participants were able to choose between the English and Arabic versions. The questionnaire was divided into different sections for easy reading and completion. A short, simple and informative cover letter (see Appendix A) was created to inform the participants of the aims and importance of the research. It was written carefully using

clear language to encourage participants to provide honest and unbiased information, and emphasised the privacy and confidentiality measures put in place.

Utilising information gathered from the literature and bearing in mind the central research questions, the project was able to develop a questionnaire draft directed towards answering the research questions and concerns. The required information was presented into several sections for easy analysis and inference. Figure 3-3 depicts the sequence and aim of the different sections presented in the questionnaire draft. Participants were randomly selected using the above-mentioned criteria (citizens with a fair level of education and reasonable income). Different segments of the Omani society were chosen to provide a fair representation of people with good education and income. Participating organisations were selected according to the support obtained and contacts were arranged to facilitate the distribution and collection of the surveys. The questionnaires were administered, controlled and followed up by the researcher to enhance the response rate. The response rate was 100% owing to the high level of support obtained from the participating organisations.

3.4 Data Analysis Strategies

According to Yin (2003), "The analysis of case study evidence is one of the least developed and most difficult aspects of doing case studies". The research followed the design recommended by Myers and Avison (2002) to ensure smooth movements from its objectives and questions, to theories, to specific uncovered data and finally, to results and conclusions. The general approach was to use survey data to develop profiles for those people almost certainly or least likely to use e-government in Oman and later use interview results to refine, give details and supplement these profiles. This study followed a sequential explanatory strategy as explained by Creswell (2003), "…to use

qualitative results to assist in explaining and interpreting the findings of a primarily quantitative study." The following sub-sections describe in detail the specific analysis strategies undertaken during the analysis phase.

3.4.1 Quantitative Analysis

The research followed Punch's (2003) three main quantitative data analysis steps as follows:

- creating variables
- distributing variables across the sample
- creating relationships.

The following sections describe these steps in detail.

3.4.1.1 Defining Variables

Referring to Figure 3-3 that describes the layout of the questionnaire, each section of the survey draft produces a number of variables that are basically drawn from the different aims of the listed questions. All sections were examined quantitatively except for the Public Service Information section, which was treated qualitatively as well. The following list describes all variables drawn from the questionnaire draft regardless of its type (i.e. independent, dependent):

- background information: age, education, and income
- computer experience: PC usage place, PC usage time, PC usage purpose, and PC literacy (composite, binary)
- internet experience: internet usage place, internet usage time, internet usage purpose, internet usage cost, and internet literacy (composite, binary)
- e-commerce experience: willingness to employ e-commerce (binary), and e-commerce literacy (composite, binary)

- public services information: requirement to transact with government in near future (binary), number of transactions with government annually, and means of transacting with government
- e-government experience: awareness of e-government in general (binary), e-government benefit to Oman (binary), awareness of e-government initiatives in Oman (binary), and willingness to use e-government applications
- barriers to e-government: each barrier listed constitutes a variable that will be addressed in the analysis stage.

Composite variables are those that have been defined and calculated based upon a number of criteria or scores of different answers. The following paragraphs explain in detail how each of these composite variables has been defined.

Computer Literacy: According to the Webster Dictionary (2004), "literacy is the ability to read and write" and computer literacy is the "basic skill in use of computers, from the perspective of such skill being a necessary societal skill". The study defines a

Computer Experience

[5] Have you ever worked on a computer?
a. Yes b. No (*please go to question 16*)

[6] Where do you use a computer ***usually***? *Choose more than one option if applicable*
a. Home
b. Work
c. School
d. Others *Please specify ……*

[7] How often you use a computer ***daily***?
a. Less than 1 hour
b. Between 1 and 3 hours
c. Between 4 and 10 hours
d. More than 10 hours

[8] What do you use a computer for ***mainly***? *Choose more than one option if applicable.*
a. Internet applications (e.g. email, Chat, Browser, …etc)
b. Office applications (e.g. Word processors, Spreadsheets, Databases, …etc)
c. Games and entertainment
d. Others *Please specify ……..*

Figure 3-4: Computer experience section of the questionnaire draft

computer literate as a person who is able to use simple computer application programs such as office applications, resolve simple difficulties, browse the internet, and/or send emails. Five questions constitute the Computer Experience section of the questionnaire as shown in Figure 3-4. The Computer Literacy variable is defined as a binary (Yes or No) variable. In other words, it specifies whether the person is computer literate or illiterate.

The question to answer here is: what combination of answers from questions [5] to [8] justifies a value of Yes or No to this composite variable? It is obvious that question [5] plays a major role here (i.e. if the answer is No it indicates a computer illiterate person). Also there are instances where people have used computers once or only a few times in their lives and that do not make them computer literate. Computer skills need frequent practice or will usually be forgotten easily. The key here is the time spent daily on computers (question [7]). On the other hand, question [6] does not contribute much to the measurement needed in this regard, as the location of using computers has nothing much to do with the concept of computer literacy. In addition, question [8] lists several computer skills all of which are basic talents of a normal computer literate person only if the person practises them frequently. Consequently, the study concludes that questions [1] and [7] jointly measure the Computer Literacy variable. Figure 3-5 illustrates in a decision tree the combinations used to measure and define both Computer literate and Computer illiterate people.

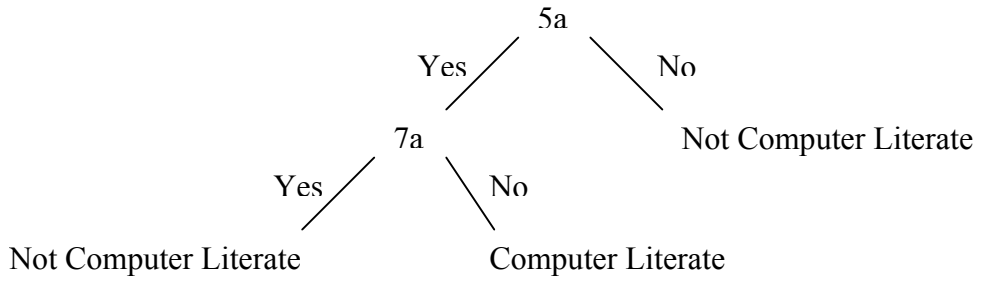


Figure 3-5: Decision tree for determining computer literacy

Internet Literacy: the study defines Internet Literacy as the ability to navigate through the internet and utilise one or more of the internet applications such as email and/or discussion forums. This variable assumes Computer Literacy as a pre-requisite (i.e. internet literate people should be computer literate). Figure 3-6 depicts the corresponding section from the questionnaire draft.

Internet Experience

[9] Have you ever used the internet?
a. Yes b. No *(if 'No', please go to question 16*)

[10] How often you use the internet ***daily***?
a. Less than 1 hour b. Between 1 and 3 hours
c. Between 3 and 6 hours d. More than 6 hours daily

[11] Where do you use the internet ***mainly***?
a. Home b. Work c. Internet café d. School

[12] Estimate how much you spend ***monthly*** to use the internet?
a. Less than 5 R.O. b. Between 5 and 10 R.O.
c. Between 10 and 25 R.O. d. More than 25 R.O.

[13] What do you use the internet ***mainly*** for? *Choose more than one option if applicable*
a. email
b. Chatting and entertainment
c. Information and knowledge search
d. Others *Please specify* ……...

Figure 3-6: Internet experience section of the questionnaire draft

Following the same procedure adopted earlier for the Computer Literacy variable, questions [9], [10] and [13] have been selected to measure this composite variable. Questions [10] and [12] were discarded simply because of their low relevance. Question [9] answer "a" does not indicate alone that the person is internet literate. People tend to forget basic internet skills when they don't practise them frequently (question [10]). Note that from question [13], the study selected answer "c" as a pre-requisite for any internet literate person. A person who ONLY uses the internet to check his/her email or visit a chatting arena does not represent an internet literate person. Such facilities are generic nowadays and are available literally everywhere, which means it does not require any internet-specific skill to do it. Internet literate people know how to

browse and find their way through the different internet sites (a basic skill needed in e-government which is related to the general aim of the study). Figure 3-7 explains the measurement combinations for the Internet Literacy composite variable.

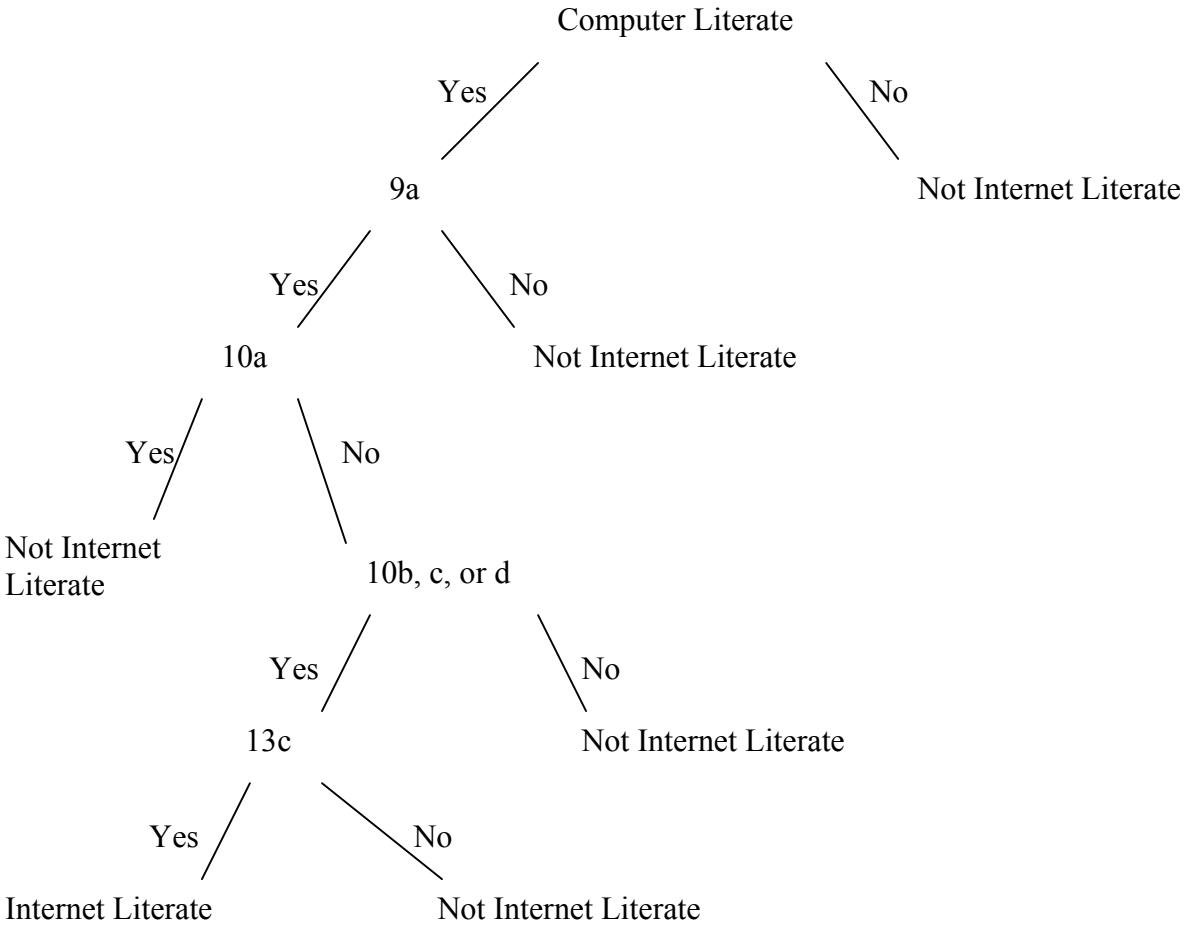


Figure 3-7: Decision tree for determining internet literacy

E-commerce Literacy: the study defines e-commerce literacy as the ability to perform transactions with businesses through their websites. This variable assumes Internet Literacy as a pre-requisite and, therefore, Computer Literacy as well. Figure 3-8 shows the corresponding part from the questionnaire draft. Measuring this variable is simpler than the previous composite variables given the explicit nature of the questions. A "Yes" answer to any of question [14]'s listed inquiries will indicate an adequate capability and evidence of the capability to perform e-commerce activities. It is only when all questions are answered "No" that the person can be categorised as an e-

commerce illiterate. It should be noted that part "b" of question [14] examines whether a person has enacted the simplest tasks of e-commerce: searching for information on goods or services. A "No" answer to this should indicate that a person is not aware of e-commerce potential and is therefore e-commerce illiterate. Figure 3-9 displays the E-commerce Literacy measurement combinations.

E-commerce Experience

[14] Have you ever:

a.	Shopped on the internet	Yes	No
b.	Used the internet to find information about services and products	Yes	No
c.	Paid for products or services on the Internet	Yes	No
d.	Requested further information about certain products or services	Yes	No
e.	Paid utilities' bills using any electronic medium like the internet	Yes	No
f.	Conducted any other e-commerce transactions in the internet	Yes	No

[15] If you've answered yes to one or more of the above questions, are you willing to do more?
a. Yes b. No
If 'No', why?
……
……

Figure 3-8: E-commerce experience section in the questionnaire draft

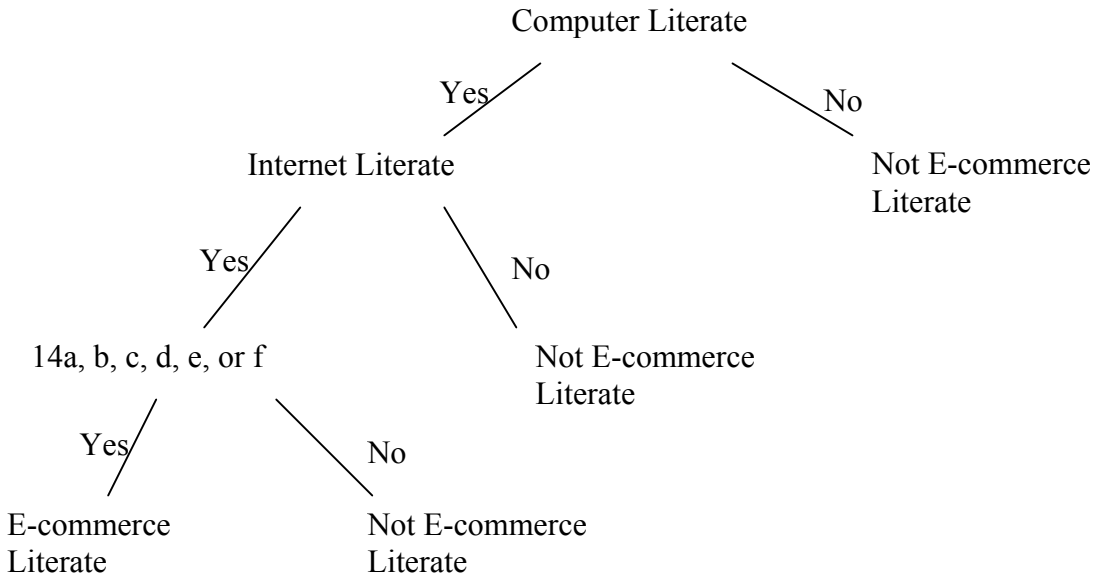


Figure 3-9: Decision tree for determining e-commerce literacy

3.4.1.2 Statistical Analysis

The survey data was analysed to detect significant relationships between variables. It was seen that there were many potential relationships, including:

- age with computer, internet and e-commerce literacy
- education and income level with computer, internet and e-commerce literacy
- computer, internet and e-commerce literacy with willingness to embrace e-government.

The ultimate aim of the statistical analysis was to draw a profile of those people who are most likely to use e-government services and vice-versa. This goal has been achieved using the following statistical methods:

- Frequency Distribution: frequency distribution for grouped data has been performed between base variables (Age, Income, and Education) and other dependent variables (Computer Literacy, Internet Literacy, E-commerce Literacy and Willingness to Use E-government). Various kinds of charts were used to display the results graphically. Figure 3-10 shows an example of these frequency distribution charts.

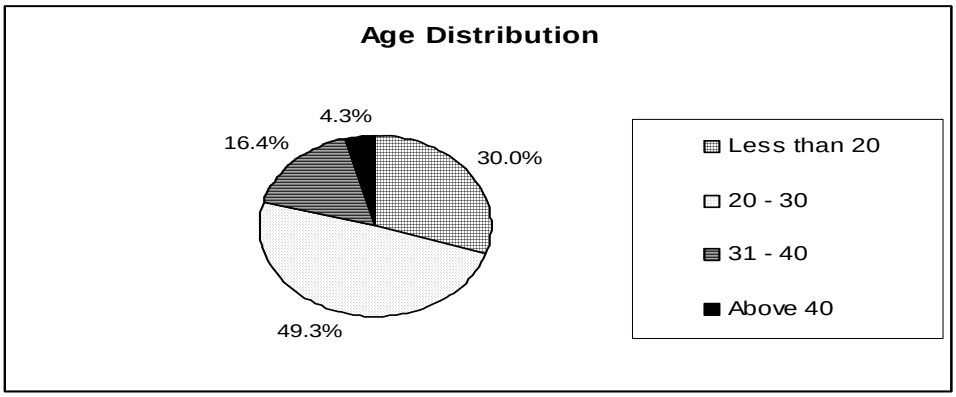


Figure 3-10: Frequency distribution of participants by age groups

- Correlations Methods: relationships between different variables were examined and highlighted using correlation techniques. Table 3-1 lists all the correlations examined between the different variables of the survey. Figure 3-11 illustrates an

example of the correlations examined. It shows that there is a positive relationship between age levels (except people over 40) and IT literacy variables.

Table 3-1: Correlations examined between the variables

Independent	Dependent
Age Income Education	PC literacy (Composite) Internet literacy (Composite) E-commerce literacy (Composite) Awareness of e-government in Oman Awareness of e-government in General Willingness to do e-commerce (binary) Willingness to use e-government (binary)
IT Literacy (PC, internet and e-commerce)	Awareness of e-government in Oman Awareness of e-government in General Willingness to do e-commerce Willingness to use e-government
Frequency of annual government transactions Awareness of e-government in Oman Awareness of e-government in General Willingness to do e-commerce	Willingness to use e-government

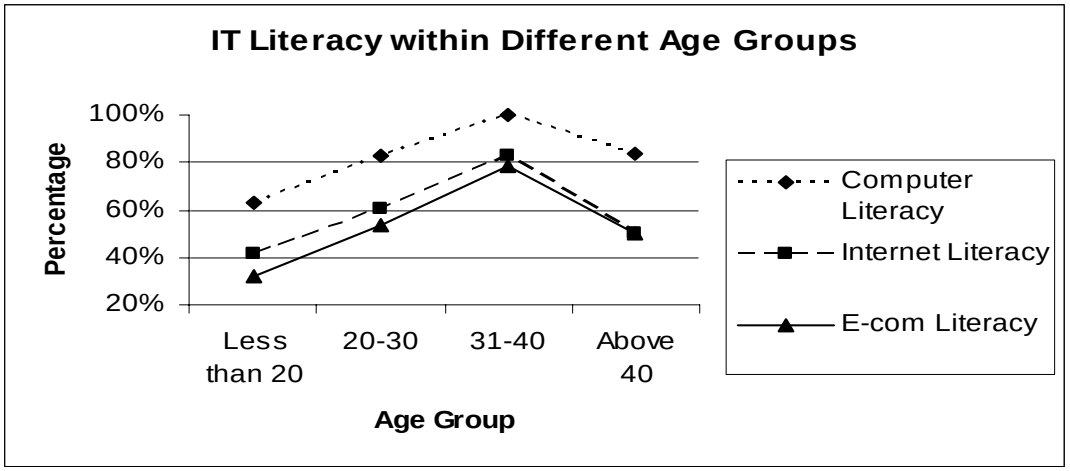


Figure 3-11: A chart of relationship between IT literacy variables and age groups

- Basic Chi Square (χ^2) technique: as previously noted, investigating barriers to the uptake of the Omani e-government initiative was central to this research. Thus particular emphasis was placed on exploring possible relationships between perceived barriers to e-government (Question 22 in the survey) and willingness to use e-government (Question 21b in the survey). Basic χ^2 tests were employed to elaborate upon and further examine relationships between some of the low significance findings from the correlation tests, and significance was set at the .05 level. As an illustration, one of the contingency tables (from Appendix C) is reproduced below.

Table 3-2: Sample chi-square contingency table used in data analysis

	Relevance - Barrier 7 (Poor Infrastructure and Technologies)					
Willingness to use e-government	Very low	Low	Neutral	High	Very high	Totals
Yes						
Actual	11	18	44	30	28	131
Expected	10.37	17.91	43.35	32.99	26.39	131.00
xSquared	0.04	0.00	0.01	0.27	0.10	0.42
No						
Actual	0	1	2	5	0	8
Expected	0.63	1.09	2.65	2.01	1.61	8.00
xSquared	0.63	0.01	0.16	4.43	1.61	6.84
Totals	11	19	46	35	28	139
					χ^2	**7.25**

In this particular example, the relationship between survey respondents' infrastructure concerns (barrier 7) and their willingness to use e-government was investigated. In this particular instance, with 4 degrees of freedom, values of up to 9.49 may be expected to occur by chance. Thus, the χ^2 value obtained (7.25) indicates that there is no connection between the two variables.

Further and more basic analysis of survey results was undertaken to identify details such as the raw percentages of the sample population that were computer, internet and e-commerce literate, the characteristics of these sub-populations, attitudes

towards the e-government project and much more. These findings may be generally categorised as follows:

- general characteristics of the survey sample (profile) and a comparison with the wider Omani population
- levels of computer, internet and e-commerce literacy
- characteristics of computer, internet and e-commerce literate survey respondents, particularly age, income and education level
- the extent and form of government interfaces
- attitudes to the e-government initiative and views on its potential success (or otherwise)
- views on the major impediments (barriers) to the successful implementation and diffusion of the e-government project
- relationships between views on barriers to the success of the project and intentions to use the technology and applications
- a more fine-grained analysis of the relationships referred to immediately above, distinguishing between those who are computer, internet and e-commerce literate and those who are not.

3.4.2 Qualitative Analysis

The research has carried out an exploratory case study with the aim of producing an e-government adoption framework. Combining both the quantitative and qualitative data analysis findings helped to establish the framework. The quantitative analysis has produced a profile of citizens who are most likely or least likely to use e-government services in Oman. It has identified critical relationships between vital factors and variables to the adoption of e-government in Oman specifically and in the Arab world in

general. Interviews, on the other hand, have been indexed and summarised into main points or themes. The main points have been grouped into several categories. These categories or themes have been used to supplement and refine the results from the quantitative analysis. The themes were developed around the central research questions and aims, as follows:

- e-government / e-commerce plans and strategies
- e-government / e-commerce accomplishments
- issues to e-government adoption and dissemination

These classifications were used to refine and elaborate upon survey results. Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis was conducted upon the information gathered from the interviews and other government publications to conclude the success and failure factors facing Oman's e-government (chapter five). These factors were used further in combination with the results achieved from the quantitative analysis to draw valuable conclusions or grounded hypotheses related to the uptake of e-government in Oman such as:

- Education, PC and internet literacy are the main drivers of willingness to use e-government.
- Without strong leadership, support and understanding, marketing and awareness-raising programs, and the IT adoption rate in Oman will be low.
- Trust in and desire to use e-government services can be enhanced by continuous marketing, offering incentives and imposing higher tariffs on manual transactions, and adopting e-laws to govern online activities.

3.5 Internal and External Validity

According to Leedy (1997), internal validity seeks to ensure that the study is free

from any bias in forming inferences and conclusions, while external validity aims to ascertain how general conclusions can be assumed in reference to the chosen sample of investigation. Significant measures have been adopted to free this study from any bias either internally when analysing data or externally when selecting participants and organisations.

Pre-defined systematic methods were followed in analysing the quantitative and qualitative data. Yin (2004) suggests that the Pattern-Matching method is to be adopted whenever internal validity is of concern. This method was used extensively when collecting and analysing data. Advanced nations' experiences were reviewed for barriers to e-government, proposed solutions and practical lessons that could be helpful to the Omani situation. This information has been matched and compared with to surveys conclusions and interviews to form valuable recommendations and, ultimately, to build an e-government framework for adoption. In addition, as previously discussed in section 3.3, the following of Yin's (2004) three principles for data collection aimed to ensure the internal validity of the study through adopting triangulation, developing a database of gathered data and maintaining a chain of evidence. These processes were adopted throughout the data collection and analysis phases.

External validity, on the other hand, is more concerned about the investigated sample and whether the conclusions reached can be generalised beyond the sample. This study has set criteria for sample selection. The criteria were reached after a thorough analysis of possible targeted users of e-government. Bearing in mind the diverse nature of Omani society (in terms of many factors such as income, education, and age), and the current high internet costs, a decision was made to choose only people with a certain level of education (secondary certificate and over) and/or income as they are more likely to benefit from any e-government initiatives—at least in the short term

(more details can be found in section 3.3.2.1). In addition, the education criterion is likely to be a pre-requisite for direct e-government users (i.e. individuals interacting directly with the e-government system with no intermediaries) since IT courses in Oman are now offered only at level 11 in secondary schools in Oman (Ministry of National Economy – Oman, 2003a). On the other hand, the income factor will most likely persist for as long as the government takes to propose and launch subsidised initiatives. Thus, conclusions reached are specific to direct e-government users and it is likely to remain that way, which indicates that the study's external validity can not be generalised beyond potential direct e-government users based upon the established criteria. Despite this, the study's findings are believed to be relevant also to countries that share basic demographics with Oman such as the Gulf Cooperation Council (GCC) countries.

As for the possibility of bias in selecting organisations from which participants were selected, organisations were chosen according to the following criteria:

- For the sake of interviews, only those organisations that are in a position to provide views on technology adoption and that usually have good records of advanced technology adoption were selected. These were available in limited scale, which made the selection process pretty much straightforward.
- For the sake of questionnaires, giving the time constraint of the study and the lengthy routine procedure needed to approve the distribution of surveys within the public and private agencies, only those that offered the greatest support to the research in the shortest time were chosen, and contacts were arranged within those agencies to help in the distribution and collection of the questionnaires. Again, the selection was straightforward on a first-come first-served basis.

3.6 Summary

This chapter provided an outline of the research design and methodologies used. In general, the literature review aimed to refine the research questions, draw lessons about e-government adoption and dissemination and build a survey instrument. Oman case study was conducted to address barriers to the uptake of e-government in Oman and propose solutions. Next chapter (Chapter four: Uptake of E-government: Barriers and Lessons) is the second part documenting the literature review process. It defines the major obstacles to e-government adoption along with the corrective programs and activities adopted by nations around the world. It also identifies key lessons to Oman in the development and diffusion of e-government from advanced nations' experiences.

4.0 Uptake of E-government: Barriers and Lessons

Developing an e-government system is a complex and difficult undertaking, even for advanced nations. Despite the fact that ICT systems are valuable communication tools, they also bring many technological and cultural concerns. Weisinger et al. (2003) state: “It is ironic that Information Technology is currently serving as both a facilitator of the global economy and as potential impedance to its advancement”. Broadly, however, e-government is still in its infancy and only recently has it gained attention and momentum. For example, Stowers (2003) argued that e-government is still a new discipline in USA. As an example of online transactions, he surveyed 32 public agencies in USA and found that 90 per cent offered phone numbers and addresses, 65.6 per cent included email links, and only 21.9 per cent had a structured complaints e-form. Stowers believes that e-government in USA was only taken seriously in 2002 when the Bush administration announced an e-government strategy that focused on transforming the activities of federal agencies, covering all types of e-government applications.

This chapter forms the second part of the literature review. Here, the researcher investigates the literature base for barriers to e-government adoption and dissemination. In addition, advanced nations are reviewed to draw valuable lessons about e-government adoption for the Omani situation. The chapter starts with a description of the barriers to the uptake of e-government categorised into two main groups: technical and non-technical, with an emphasis on the latter. Subsequently, solutions and helpful guidelines to tackle obstacles facing e-government adoption and dissemination are

discussed in section 3.4. Advanced nations' experiences in e-government are examined next, followed by concluding remarks.

4.1 Introduction

Given the lack of sufficient literature in the area of e-government especially within the developing world, e-commerce literature was used frequently throughout the study to provide rough trends and views. Swartz (2003) acknowledges the massive success of e-commerce in UK, which reached US$1.6 billion in retail sales in 2001. However, take-up of e-government services by the British population has been slow, with only 15 per cent using such services in 2001. Aoki (2000) states that although Japan has the second-largest number of internet hosts in the world following USA, it is still lagging behind in e-commerce and e-payment. The developing countries on the other hand are most certainly not in any better shape. For example, The E-government for Development Information Exchange Project (Commonwealth Telecommunications Organisation, 2002) and Heeks (2003) noted that, for e-government projects in developing and transitional countries, 35 per cent were total failures, 50 per cent were partial failures and only 15 per cent were successful.

The reasons for poor e-government implementation rates include the difficulties encountered in system development and implementation. What are the causes behind these failures? If the causes are technical, then what is wrong with the UK's e-government initiative that discourages British citizens from using it? Why are the Japanese people unwilling to pay online, despite their support for other advances in technology? It is probable that the barriers are not only technical, as the UK and Japanese populations are considered technologically astute.

The next two sections describe the technical and non-technical barriers faced by many countries when attempting to adopt e-government systems. A deeper investigation of non-technical barriers is provided giving the central importance of such factors to the study.

4.2 Technical Barriers

The level of physical access to proper ICT systems differs substantially between countries and regions around the world. According to UNPAN (2004, xi), "…the majority of the developing country population of more than 5 billion faces a grave challenge from the new technological revolution". Many technical factors might enable or inhibit adequate improvement and development to e-government systems. The following are the most common technical barriers to the adoption of e-government.

4.2.1 Infrastructure

Infrastructure issues are the most common technical inhibitors to e-government development and dissemination, and this factor is particularly relevant to developing countries. For example, Ghareeb (2000) claimed that problems with technical infrastructure are a major constraint to the spread of the internet in the Arab world. In addition, Aladwani (2003) found that internet cost is beyond the purchasing power of an average citizen in the Arab world. In Oman for example, in 2003, a dial-up connection to the internet cost around AUD$ 0.78 per hour, or AUD$ 18.72 a day "24 hours" and AUD$ 131.04 a week "24/7" (OmanTel, 2003). In Bangladesh, Hasan (2003) also found many technical obstacles to adopting e-government related to infrastructure such as:

- high internet access cost
- expensive and delayed telephone line access
- only 1.1 per cent of Bangladesh's population has electricity

- copper network cables (in lieu of fibre optics) have slow transmission times and the cables are susceptible to damage.

Other barriers connected with poor infrastructure and technologies that may also affect e-government are inflexible legacy systems that were designed for specific reasons, absence of shared standards and communication between agencies, and lack of preparation for technological change. Attempts to adopt new technologies without fully knowing the implications of ICT are one of the challenges to e-government (Chang and Kannan, 2003). According to OECD (2003), rapid technology development increases implementation costs and there is a greater risk of failure. NOIE (2003) discovered also that the fast pace of technology advancements creates difficulties for public organisations to meet changing standards of technology, yet retain their communication focus without surpassing their users' learning habits. The office also found internet restrictions in transmitting large volume files, such as online tenders for helicopters and submarines where security and content of the documents were compromised.

4.2.2 System Development Methods

E-government systems development also faces many technical obstacles. "One of the biggest challenges to implementing e-government is the need for a seamless approach to serving citizens and businesses. A seamless approach implies a common vision, a common delivery strategy, and numerous back-office changes including organisational change, cooperation and collaboration" (OECD, 2003). E-government portals should be developed using the best methodologies, bearing in mind the users' requirements and abilities. In addition, Stowers (2003) found that attempting to develop sites that are partially public and partially private in USA, such as www.usps.com, and www.usps.gov, may confuse system developers, since the design of e-commerce sites focuses more on graphics and animation and little on text whereas e-government sites

usually focus more on imparting information. NOIE (2003a) identifies the following developmental challenges to achieving higher e-government take-up rates:

- How usable are the websites?
- How complete is the information provided?
- How easy is it to find the government services online?
- How successful is the search facility?
- How secure and confidential are both the site and the personal information that is gathered?

4.3 Non-Technical Barriers

According to Hasan (2003), "A country's social, political, and economic composition correlates closely with its e-government program development." Non-technical barriers are as vital as the technical ones and require thorough understanding and planning. According to UNPAN (2004), South and Central Asia and Africa are way behind in terms of usage of ICT for development mainly because of issues related to infrastructure and education. The latter is an important non-technical factor that contributed to the delay of development in those regions. The same source (UNPAN, 2004, 118) added that access to ICT for development is affected by several economic and social barriers such as language, income and culture that contribute to creating an access divide.

Non-technical barriers are substantial to the study. The main sources for such impediments are usually people who develop, manage and/or use an e-government system, and the environment that hosts the system. The barriers have different levels of impact also, some with wider national effects and others with more individual influence. The following paragraphs describe these factors in more detail.

4.3.1 Culture

Davison and Martinsons (2003a) stated that "…people from the same culture and linguistic group may find it difficult to communicate effectively. However, additional problems arise with interactions across cultures." Many researchers have examined cultural issues in and between different nations, especially in the field of internet-based applications. Lowe (1998) investigated differences in cultural values between Australians and Chinese with respect to marketing and advertising. He concludes that causes for a behaviour in one country cannot be assumed to be the same as in another. Stylianou (2003) looked at Chinese people's perceptions about e-commerce. He used the Technology Acceptance Model (TAM) to examine external cultural variables and pointed out that Chinese people rely on the use of cash, which causes great resistance to their use of e-payment that requires credit cards. Much has been written (Swartz, 2003), (The Economist, 2003) about the UK's e-government experience and the reluctance of British people to use the now well-established facilities. Aoki (Nov 2000) compares Japan to the USA in terms of cultural differences in e-commerce and concludes that Japanese are a cash-based people; they like to pay with cash rather than use credit cards. This has forced them to generate innovative ideas for payments – such as 'Cobinis', which has been defined as "a physical store, which acts as a mediator between buyers and sellers in the Internet" (Aoki, 2000). Another comparison between the USA and China (focusing on cultural disparities in e-commerce) found that the main cultural differences in e-commerce between the two nations are language, cultural values and infrastructure (Bin et al., 2003).

The Arab world and the developing countries appear to be no different. However, few scholars have examined the impacts of culture on the introduction of the internet in the developing nations, with little evidence of any serious examination of the

effects of culture on e-government. Zakaria et al. (2003) characterises three common cultural values in the Arab world: collectivism, honour and hospitality. In addition, Fandy (2000) examined the cultural impacts of new media such as the internet in the Arab world. He concludes that Arab people are flexible but very selective when it comes to trust. There are also many Arab cultural barriers to the adoption of the internet (Loch et al., 2003). This latter source argues that norms, beliefs and values in a certain culture might affect people's behaviour and attitudes towards using the internet.

4.3.2 Politics

A government's political practices both internally with its own citizens and externally with other governments around the world might heavily influence e-government development and adoption. For example, Gilding and Critchley (2003) discovered that Australians do not trust ICT information from their government as opposed to ICT information from universities. In addition, further security challenges and concerns started to face federal agency web managers in the USA after the 9/11 attack, such as the removal of sensitive information that could be used by terrorists (Stowers, 2003).

Peters (1999) studied reasons behind people's level of trust in their governments and indicated that citizens' trust is negatively influenced by government scandals, incompetent performance and policy failure. Welsh et al (2005) provided examples in the USA that caused a decline of public trust in government, such as the Vietnam War and the Watergate scandal in 1974. In addition, Mullen and Horner (2004) argued that people might very well feel victims of social injustice when access to electronic services and systems is somewhat prejudiced (access-divide), which negatively affects their trust in the government.

4.3.3 Leadership Support

Leadership understanding and support is critical to the successful development of e-government. Sanchez et al (2003) stated that some government officials may resist e-government because it may seem like a menace to their power and capability. Moreover, the fear of failing to implement a solid e-government system, which might result in losing the involved officials, organisation and country's image, might also contribute to that resistance (Heeks, 2003). Lack of support and knowledge among government decision-makers may also lead to other related factors if ignored (OECD, 2003), (IDeA Knowledge, 2004, 15) such as:

- poor project management
- technology failure
- lack of funding
- very high political demands and expectations.

These common barriers are critical to implementation. For example, Swanson (2002) claims that about 60 per cent of e-government initiatives fail due to: lack of commitment from high-level officials; funding; and project control. Heeks (2002) discusses the challenges to e-government adoption in Africa. He concludes that lack of both finance and any e-readiness strategy may cause a slow diffusion rate. The researcher noticed that many e-government projects have failed in Africa because they simply conflicted with some leaders' personal interests. OECD (2003) found that expenditure in e-government should be viewed as an investment and cost-effective solutions should be pursued.

4.3.4 Security and Legislation

Countries around the world vary in the level of online security measures

adopted. Dix (2002) states that most e-government initiatives in USA are not secure enough against external interference that negatively affects adoption. OECD (2003) found that legislation, security and privacy issues could impede the uptake of e-government and therefore these matters should be carefully addressed. As an example of such law enforcement in the USA, Stowers (2003) argues, "…several sites within the Department of the Interior were closed in early December 2001 due to the legal decision declaring that any sites containing Indian trust data had to be disconnected from the Internet".

Proper online legislation is needed but will not always guarantee adoption. For example, NOIE (2003) reveals that individuals and organisations are hesitant to use online services despite the presence of legislation and security measures due to the fact that online legislation, security, and authentication have not yet been legally tested. The office also concludes that new online legislation might add extra costs to public agencies by forcing them to adapt business processes, further impeding e-government adoption plans. In addition, the difficulty of justifying marketing costs in terms of financial payback and the perceived notion that the internet lacks accountability and offers anonymous inputs discouraged many public organisations in Australia from providing advanced services (AGIMO, 2005).

4.3.5 Demographics

A society's level of ICT knowledge, education and income is perhaps one of the most important factors affecting e-government take-up. Taylor et al (2003) examined the effects of demographic and socio-economic factors on internet use in the Central Queensland region in Australia and proved that such factors highly influence people's attitude to and usage of the internet. For example, the researchers found that males with higher education and income level are more likely to use the internet at home for work

whereas younger people aged 18 to 24 or those with secondary education and above are likely to use the internet more for educational purposes. Ghareeb (2000) investigated internet adoption in the Arab world and highlighted that "the number of those who can afford to buy computers, know English, and access the Internet, is still quite minuscule". People require a certain level of education and income to be able to use and pay for computers. According to a leading economic development and management consultancy firm in the UK (SQW, 2005), UK government's websites are more likely to be accessed by segments of the society having higher income and education.

In the same sense, unemployed people might not be able to use the online services although they have a high need to transact with government (OECD, 2003). For example and according to AGIMO (2004a, 84), one of the most important problems for e-government in Australia is the lack of participation from those segments of society that interact with government the most. In New Zealand, the E-government Unit (2004, 5) stated that the majority of people were not aware of the government's online services. This might be due to the fact that they simply did not know (lack of marketing and awareness campaigns), or they were unable to locate the website or the information and services on the website (lack of education and training).

4.3.6 Users' Trust

According to Chopra and Wallace (2003) electronic environments pose three dimensions of trust:

- How credible is the information found in the internet?
- How truthful are the information systems to be used?
- How honest and trustworthy are the people we interact with electronically?

Gefen et al. (2002) classify trust as one of the three main factors that predict the rate of e-government adoption, the other two being social influence and website ease of

use. The researchers claim that, although trust issues affect both e-commerce and e-government, e-government is affected more. In addition, NOIE (2002) has also identified confidence and trust as major cultural problems that might contribute to many other non-technical factors. As mentioned above, Gilding and Critchley (2003) discovered that Australians trust ICT information from universities, hospitals and scientists but not from their government, major companies and the media. The writers also add that trust issues are susceptible to stereotyping and, when once lost, re-earning trust is very difficult.

Trust could be 'contagious' in some instances too. For example, Poon (2002) has found that in Hong Kong's joint venture e-government project, which co-hosts government and business organisations within the same portal, whenever a private business product is displayed within a government website, it can be thought of as a government creation and therefore avoided, for example wedding gift products displayed in a wedding registry website. Besides, trust can sometimes relate to the user's level of IT competence (Parent et al., 2004). According to this source, people with a high level IT capability and who retain trust in a government would have these particular qualities reinforced through their use of e-government services. Conversely, the authors claim that people who distrust their government and have low levels IT skills will not change their trust according to the medium of delivery. Therefore, the researchers (Parent et al., 2004) declared that "if politicians' aim is to increase trust, they would be better-served to focus on non-web-based courses of actions".

4.3.7 Users' Needs and Expectations

Users' needs and involvement are central to e-government development. Stansfield and Grant (2003) concluded that lack of users' support structures, their motivation toward IT, fear of being robbed and lack of user knowledge may reduce e-

government take-up rates. Criado (2003) criticises Spanish municipality websites for having a low orientation to citizens' real requirements and sees a real need to determine and act upon underlying user motivations at local levels of e-government. This emphasises the need to enhance users' motivation by meeting their needs. In this regard, Joines (2003) argues that motives and concerns play a greater role in determining subjects' actions with respect to web usage than do demographics and, furthermore, concludes that people shop online to save money and to get information more efficiently. Consequently, governments and companies should give them precisely those things.

On the other hand, high user expectations can put pressure on governments. For example, OECD (2003) concludes, "Both citizens and businesses expect governments to adapt, and their expectations will grow as the information society becomes more widespread. Governments must rise to the challenge of new technologies as these technologies continue to evolve". A good example of where a government should have worked to meet users' needs and expectations is in the e-Visa system in Australia. NOIE (2003) points out that the e-Visa application program designed for tourists suffered some communication problems due to the fact that the website was written in English only, and that versions in other languages would assist.

4.3.8 Resistance to Change

The tendency of people to resist changes, especially when they require extra effort, is another major problem for e-government adoption that needs to be managed. NOIE (2003) points out that the e-filing project enabling litigants to lodge court documents online faced few cultural problems. Traditional law firms, many of the Federal Court staff, and some litigants resisted using the e-filing system due to the conservative nature of the legal work as well as some concerns regarding privacy and

security issues. Another example of resistance to change was witnessed in an e-voting initiative in USA. According to Done (2003), a legal case filed by the Voting Integrity Project in Arizona against the development and use of an internet-based voting system claimed that white people had an advantage in usage of e-voting due to their greater access to home computers, while African-Americans and Hispanics were disadvantaged in that respect. The case was dismissed and immediately a campaign was launched by the Arizona government to promote and prepare for the e-voting system by a strong educational outreach activity aimed to educate disadvantaged people on the benefits and means of e-voting.

4.4 Proposed Solutions

Most of the barriers to e-government development and dissemination mentioned earlier can be categorised as follows:

- Planning and Control: how efficient and effective are the planning and control measures undertaken to minimise risks? This category is highly influenced by the government organisations' internal politics, and usually covers issues such as leadership and staff support, funding, process reforms and development of online legislation.
- Design and Development: how successful is the government portal or website in meeting users' expectations and needs? This category includes the technical design and development issues that demote the site's attractiveness and usability.
- Adoption and Take-up: how widely used are the e-government initiatives among the potential users? This category deals with cultural and non-technical factors that influence users' willingness and ability to use the online services.

UNPAN (2004, 119) listed the following key imperatives for governments in the successful development of e-government initiatives:

- adopting Access-for-Opportunity frameworks that further define opportunities that may be achieved with access to ICT
- building knowledge societies
- including ICT in all planning initiatives
- addressing the regulatory and legal environment of development
- educating leaders, managers and officials in planning and managing ICT across public sectors.

The following paragraphs discuss the solutions found in the literature based upon the previous major categories.

4.4.1 Solutions to Planning and Control

Leadership support and understanding are important requirements for any successful e-government system. OECD (2003) declared that “Managers must be able to lead (and not be led by) the organisation’s IT department and outside partners, and must be able to integrate the organisation’s ICT strategy with its broader goals.” Managers and staff should have the necessary ICT skills and knowledge to plan and manage effectively the system’s developmental life cycle. Chen (2002) urged public sector senior managers to give continuous support to an IT project as well as maintain awareness of current e-government practices and vendors. He also mentioned that government IT staff should have sufficient technical knowledge to negotiate an IT contract. All executives and employees should undertake e-government awareness training, particularly in regard to its threats and opportunities (Alsawafi and Sridhar, 2003). Stowers (2003) suggests that ICT based education and training would help to enhance the public IT awareness issue as well as gaining leadership support.

Continuous monitoring and evaluation throughout the project life cycle are crucial to identify benefits and impacts on users and stakeholders, and ultimately to keep and enhance political and public support (OECD, 2003). The OECD sees benefits to systems integration in defining and measuring demand for services, cost/benefit analyses and identifying external impacts on users. Another crucial issue is to ensure the integrity of system security. Heiman (2003) addresses the security concern in online systems and argues, "It is simply wrong to place the burden of security solely on the shoulders of security officers, technologies, and IT executives. Security is a shared responsibility across the entire enterprise, to include subject-matter experts, functional users, and oversight professionals." He thoroughly examined this issue and offered suggestions such as developing organisation-wide security architecture, setting security metrics and controls to measure intrusions, and using up-to-date security technologies.

In brief, many references (OECD, 2003), (NOIE, 2003), (The Audit Office of New South Wales, 2001) address planning and control issues and recommend the following factors:

- Leadership's full support and understanding of the e-government program is required.
- Government process reforms should be integrated through e-government development activities.
- Coordination and collaboration between different public and private agencies should be emphasized to achieve program stability.
- E-government funding and costs should be measured accurately and perceived as an investment.
- Legislation should be enforced to secure online activities and information flows; and accountability measures undertaken to define responsibilities and rewards.

- Marketing campaigns should be used to enhance public awareness and understanding of e-government services.

4.4.2 Solutions to Design and Development

It is imperative that government websites are developed to address citizens' needs and life situations rather than reproducing government departments' services online (NOIE, 2003), (Gant and Gant, 2003). This approach emphasises the need for inter-agency integration between public sector organisations and, in some instances, with private sector entities (OECD, 2003).

Zwane (2002) suggests four basic conditions for successful e-government systems in this regard: first to know the customer, second to be able to identify him/her at each visit, third to ensure top-level management commitment and fourth to guarantee a high level of security. Governments should also offer incentives for online services usage and should consider instant identification (Note – new Australian privacy legislation may affect this) as a feature to make individuals more inclined to use the services again (Rogers, 2002).

In short, researchers (Gant and Gant, 2003), (Huang et al, 2002), (OECD, 2003), (Stowers, 2003), and (NOIE, 2003) recommend the following policies and practices to ensure successful e-government website and portal development:

- E-government should offer users options for interactions and communications.
- The website should be user-friendly and customers' needs should be addressed effectively.
- The portal's focus should be based upon users' life events and situations, rather than simulating physical departments. Real life information should be addressed and activity routes followed through to a satisfactory conclusion for each user.

- Enhance the website's appeal to the user with customisation, and help and support features.
- Open systems could be used to solve incompatibility issues.
- Maximise accessibility of the website for all citizens and potential users irrespective of their computer literacy, their language or culture.
- Text information on government websites is more useful than graphics or animation.
- Nevertheless, innovation and creativity should be used in designing websites to make them attractive and user-friendly, rather than focusing on the newest technology available.

In addition, AGIMO (2004a, 48), recommended the following security development methods to combat e-fraud:

- using firewalls and encrypting data accessible through the internet and other public networks
- updating and testing security software, patches and anti-virus software continuously
- restricting access to data and maintaining security policy for staff and contractors
- getting insurance and adopting e-risk assessment and response plans.

4.4.3 Solutions to Trust and Adoption

Since many of the success factors and solutions mentioned in the previous categories aid in enhancing e-government adoption rates, this section is devoted to solutions regarding cultural barriers. Zakaria et al. (2003) discusses how to implement and manage culturally sensitive IT applications: specifically, they highlight the maxim, "Think globally, act locally". Bin (2003) claims that the main cultural differences in e-commerce lie in language, values and infrastructure and therefore, websites should be translated linguistically to accommodate the different spoken languages of the citizens,

and culturally to meet the country's norms and values. Pons (2003) introduces a controversial point when he claims, "Building a focused E-commerce strategy in the Arab region would help to preserve the Arabic culture and beliefs". He sees that this is possible by developing all browsers and applications in Arabic.

To enhance early adoption rates, Gefen et al. (2002) suggest e-government planners and designers first reach out to people and communities that are more likely to be open to adoption to ensure successful experiences. This is seen as a driver for social influence. A further driver is the dissemination of success stories from initial e-government users, and the likelihood that others may be encouraged to use e-government services and thus increase the perceived usefulness of the system. In addition, Fulton (2003) suggests, "In the early stages of deployment, systems should be built to accommodate the existing work practices in order to overcome resistance to change."

On the other hand, trust was seen as a crucial factor in adoption. Welsh et al (2005, 387) identified that people who are pleased with e-government and government website interfaces usually trust government more, and those users who trust government more are more likely to be happy to use e-government. Stowers (2003) sees that users' trust could be gained by emphasising issues related to the users' privacy and the perceived legitimacy of the portal through its security and privacy statements, regular content updates, proper contact details and acknowledgment of transactions (receipt). Alsawafi and Sridhar (2003) also mention the importance of security measures to enhance user trust in online services. The researchers claim, "Development of trust in e-governance involves key issues such as authentication, transaction identification, consumer privacy, validity of digital documents as legal instruments and consumer protection."

Tan and Teo (2000) argue that trust and IT literacy on online systems like internet banking can be enhanced by installing video presentations in bank branches, in this case to explain the steps of a transaction or other service. This coincides with Stowers' suggestion (2003) for an education and marketing program to enhance people's awareness and skill levels. Hasan (2003) recommends adopting IT courses in secondary schools to improve IT awareness, especially in developing countries like Bangladesh. He also found that advancements in e-commerce and e-government systems in Bangladesh are dependent on the implementation of relevant legislation.

4.5 Lessons Learned from Advanced Nations

As outlined above, despite how advanced in ICT a country is, many hurdles and dilemmas must be faced in the adoption and diffusion of e-government initiatives. Advanced nations started embracing e-government applications earlier, which enabled them to understand and adapt to e-government challenges earlier with many remedial programs and strategies. This section outlines the major lessons that can be derived from advanced nations' experiences with e-government. Primarily, Australia, UK and USA were examined for lessons in e-government take-up including their advances and relative success in adopting lucrative e-government initiatives. According to Chadwick and May (2003), USA, UK and Australia have shown e-government developers the way. The United Nations' global e-government readiness index reports (UNPAN, 2003), (UNPAN, 2004), (UNPAN, 2005) ranked Australia's e-government readiness third in 2003 and sixth in 2004 and 2005. The UK was ranked fourth in 2003, second in 2004 and fourth in 2005 in terms of e-government readiness and was ranked first in 2004 and 2005 consecutively in terms of e-participation – willingness to involve users in policy making through e-government systems, followed by the USA and then

Canada. The USA was able to hold the first position since 2003. In general, e-government development impetus has differed over time between different countries, which has resulted in small advanced countries surpassing larger ones (UNPAN, 2004, 23). For example, Australia scored third in the world in 2003 but was outshone by more active nations in 2004 and 2005 (UNPAN, 2005).

Additionally, lessons have also been extracted from other advanced nations like Korea and New Zealand that scored fifth and thirteenth globally in terms of their e-government readiness respectively according to the latest UN report (UNPAN, 2005, 25). The lessons to be learned are as follows:

Lesson One: *Develop a national e-government vision and ensure high leadership support, commitment and understanding.* It is crucial to develop a national vision guiding all improvement plans in relation to ICT and e-government. The strategy must not be in papers only, but a strong leadership loyalty and understanding of the benefits expected should be assured to push development forward. Wescott (2001, 15) emphasised the need for a national ICT strategy with leadership support. He presented an example from India in 1998 when the prime minister called on India to be one of the biggest exporters of software within ten years. This was followed by many initiatives that worked intensively to meet the goal.

It is also important to establish an independent entity with sufficient authority to plan and regulate ICT sector development. Reddick (2004) examined empirical models of local e-governments in USA and recommended the need for an independent IT department or entity to ensure successful e-government development. Such entity must always seek feedback from stakeholders and general users or else faulty plans may be implemented. For example, it was found that the Bush Administration Office of Management and Budget failed to study the impact of the digital divide on e-

government usability and to examine the potential use of ICT for crisis management (IOS Press, 2005).

Leadership understanding and support is vital too. The real benefits of ICT projects like e-government might not be apparent in the short run. According to Beynon-Davies and Williams (2003), e-government cost savings benefits were seen by many public authorities in Wales as difficult to obtain and achieve in the short to medium term. With feeble leadership support and knowledge such an example might negatively alter the willingness to adopt or develop further ICT undertakings. It might also cause management to lower priorities and resource allocations for such projects.

Leadership support might be hard to obtain especially within corrupted government hierarchies. Planning and control measures must be in place to handle corruption issues. For example, Cho and Choi (2004) described Seoul's e-government experience in fighting and preventing government corruption. According to the source, in 1999 the Seoul Metropolitan Government adopted an Online Procedures ENhancement for civil application (OPEN) system that facilitates web-based submission and processing of permits, registrations, procurements, contracts and approvals. The system emphasised transparency and accountability measures by allowing people to lodge applications and track the review and approval process in real time online. The system is believed by surveyed citizens and government officials to be of great use for corruption control. Despite this, Wescott (2001) argued that ICT may eliminate some kinds of corruption but it can also produce others. He explained that ICT managers and professionals can utilise their skills and knowledge to abuse the system in their favor, and stressed that solid control and monitoring measures must be adopted to avoid such incidents.

Lesson Two: *Define users' profiles, needs and expectations to provide information and services accordingly.* User characteristics and requirements are crucial for e-government developers to recognise, in order to determine what information and services to provide online and how to provide them. On the other hand, profiles might be hard to define as users' needs and expectations frequently change over time (AGIMO, 2005, 6), but some advanced nations were able to define approximate profiles. For example, e-government users in Australia were found to be likely be male, living in metropolitan areas, aged below 50, university educated, and working as professionals; whereas those using the telephone medium to transact with government were likely to be female with children living in households (AGIMO, 2005, 9). In addition, according to SQW (2005), younger people (16 to 24 years old) were seen to be more willing to use government websites than older ones (above 55) and similarly e-government was more popular among higher social and income levels.

In another example from Europe, in 2003 RAND Europe (an independent research entity) carried out a project to study users' attitudes towards e-government in Europe Member States, Switzerland and USA and found that (Graafland-Essers and Ettedgui, 2003, 8):

- Users are likely to favor online services that require little disclosure of personal information, such as searching for books in public libraries.
- Users who use the internet more frequently tend to have better awareness of the availability of online services and therefore, have a positive attitude towards e-government.
- Users' awareness of online services is not consistent with their willingness to use e-government and this varies among people.

- Convenience in terms of time and location factors attracts a positive attitude to e-government.
- Attitude to e-government is not uniform across countries.

An understanding what users are capable of, require and expect highly influences development and adoption rates. Teicher and Dow (2002) criticised the fact that Australia doesn't yet accommodate people for whom English is their second language, even when dealing with non-residents such as tourists applying for visas. The authors found that the majority of websites are in English; a few have various documents translated from English, but even these start with links in English only. This stresses the importance of containing and managing users' expectations. Freed (2004) saw that if the websites do not offer what users expect, this may lead to dissatisfaction and loss of loyalty. He provided a good example from USA where user needs and expectations were carefully handled in developing websites providing information and news, such as library and statistics websites, which promoted high adoption and usability. In another example showing how governments can increase adoption by managing user needs and expectations, people in Australia who preferred to use the internet had low expectations of what the internet could offer to them, which resulted in their satisfaction with the level of services offered (AGIMO, 2005, 8). The Australian government now plans to offer these people successful and more advanced services and transactions in the future, aiming to trigger higher demand through word of mouth advertising (AGIMO, 2005, 10).

The ultimate aim of meeting users' needs and expectations is to gain their satisfaction. Freed (2004) listed the following guidelines to improve user satisfaction:

- understand the audience's needs
- seek users' feedback continuously to improve judgment about their needs

- use feedback and other websites as benchmarks to improve a website
- carefully select changes with higher impact on user satisfaction
- prioritise changes according to available resources and budgets
- assess user satisfaction continuously to evaluate changes made and plan for future actions.

Lesson Three: *Develop e-government applications around the audience rather than simulating physical government agencies.* This lesson is related to the previous one in the sense that user needs must be met to ensure higher usability. Users must be able to locate and browse easily through government information and services available online. AGIMO (2005, 6) emphasised that information and services should be clear and straightforward for users regardless of their complexity (one-way or two-way communication). In addition, people in Australia were dissatisfied at the level of information and services offered through some websites due to some accessibility issues such as difficulty in locating the needed information or service, or incomplete content (AGIMO, 2005, 10).

The best development approach for government portals is for them to be developed around user types, life events or needed services and should allow users to transact with the different levels of government (Teicher and Dow, 2002). Griffin and Halpin (2005) found that most UK e-government studies so far focused on assessing the development of e-services by involving stakeholders, which indicates the importance of users in the development stage. In addition, the UK was also successful in implementing such methods in developing its Directgov (www.direct.gov.uk) portal. Users are able to search for services either by audience groups such as the disabled, or by topics such as tax.

Lesson Four: *Increase users' ICT awareness, skills and knowledge through marketing and education.* People should be aware of the available online services, capable of performing the needed tasks and informed about the expected benefits over the normal means. The government should continuously publicise e-government initiatives to inform users about where and how to utilise them. ICT education and training courses should be offered to citizens and government employees, qualifying them to be more e-enabled. In the UK, more than six thousand online centres are now available across England to provide people with internet access at no or low cost and help to enhance their ICT learning and development through introductory ICT and internet courses (SQW, 2005). The majority of the centres are open to the general public with a few targeting specific user types such as the homeless and unemployed, and more than half (51%) the centres are offering one-to-one support to users. The same source also outlines that centre staff's awareness of e-government services was seen to be relatively low, despite, the majority of centres being willing to participate in marketing the UK's online services and information with some (21%) already embedding information about e-government in their training programs. Centres indicated a need for more staff if they are to participant in promoting online services.

Reddick (2004) concludes that as users become more aware and confident transacting on the internet, e-government transactions will no longer face a demand issue but rather a supply dilemma. SQW (2005) recommends the following steps to help public internet centres participate effectively in marketing and educating people about e-government services:

- provide thorough training for staff
- conduct focused training courses and optional one-to-one sessions for users
- ensure successful experiences for users trying e-government websites.

Lesson Five: *Maintain extreme security and privacy measures to uphold and gain users' trust.* Developers and users must feel secure and protected by the law when engaging in any cyber activity. People should be held accountable for their online actions. According to AGIMO (2004, 149), accountability is an important concept in any integrated service delivery approach and manual recordkeeping could be a possible solid solution to ensure accountability, especially in the short term. On the other hand, Teicher and Dow (2002) stressed that security and privacy issues are among the top issues affecting the uptake of e-government in Australia. The source outlined that many citizens feel it is unsafe to provide personal information online to the government because they fear misuse of information by government employees and worry about weak adoption of security measures. The source described that security and privacy concerns with ATO were reduced substantially through implementing public key authentication technology to ensure confidential communication between taxpayers and the ATO.

In Australia, it was claimed that privacy of data should not be viewed in terms of ownership (which indicates that who owns it can do anything with it), but rather in terms of custodianship (i.e. the custodian controls and regulates the use of data and is accountable for its use and misuse) (AGIMO, 2004a, 10). In addition, privacy could be ensured through proper identity management tools that authenticate people's identity through various approaches (AGIMO, 2004a, 26).

Lesson Six: *Ensure successful experiences to first-time users through one- and two-way communication and interactions.* Freed (2004) outlines that the USA experience proved that e-government websites must always attempt to deliver or maintain successful experiences to users in order to retain or improve their satisfaction, and that this would be hard to achieve if needed resources and budget are limited. He

also explained that e-government in the USA is still mainly informational and lags behind e-commerce applications in terms of transactions processing and offering two-way interactions. Therefore, it is crucial when developing e-government systems to focus on the interaction experience more than the channels of interaction by ensuring successful experiences for users through satisfying their needs (AGIMO, 2004, 76). Welsh et al (2005, 387) found that citizens in the USA are pleased with e-government in areas like transparency and transaction processing, but feel that interactivity is not yet up to their expectations. The authors believed that the current one-way strategy to provide users with information and services is more desirable to the government than a two-way communication approach due to a lack of needed technology to support this strategy and/or the high risk notion associated with the latter method.

Inexperienced users will need accessible, easily usable and easy-to-navigate interfaces (AGIMO, 2005, 8). In terms of enhancing sites' usability, Australia followed the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI) and many government websites adopted the Bobby accessibility software tool to ascertain compliance with accessibility guidelines (Teicher and Dow, 2002). Reddick (2004) found that local governments with larger populations (economies of scale), individual IT divisions and those least affected by barriers to growth are more likely to adopt transactional services than others.

In spite of that, Ma and Zaphiris (2003) concluded that accessibility doesn't always guarantee usability in many instances. The authors examined fifty e-government websites in the UK using automatic evaluation tools and found that the sites are relatively compliant with the Web Content Accessibility Guidelines but interestingly, were low in usability ratings. This indicates that ensuring successful attempts by users does not involve smooth online browsing and transacting only; further incentives and

obvious real benefits over the normal means must be provided and encountered by users. As a matter of fact, the conception that e-government is utilising the internet is not enough to convince more people to use it; more incentives and encouraging programs must be offered especially for first-timer users (AGIMO, 2005, 6). The same source also (8) stated that people will only choose the internet if it adds value for them, they are aware of where and how to locate a site and can finish the online communication. The same applies to the private sector: businesses are likely to go online when there is clear value offered (UNESCAP, 2004, 23).

Lesson Seven: *Adopt a multi-channel approach to minimise users' impression of social injustice.* One of the best benefits of ICT applications is eliminating the distance barrier. People in remote rural areas benefit the most out of internet applications such as e-government, yet in many developing countries they still suffer from access and digital divide. People in rural areas in Australia, for example, were found to be using the internet more than people in regional cities (AGIMO, 2005, 7), which affirms that remote areas need the technology the most to overcome the distance barrier.

Government must seek to provide people with different channels of interaction according to their needs and capabilities, while promoting the online means. AGIMO (2004, 85) argued that the Australian government should adopt a multi-channel approach with citizens and businesses and should acknowledge and respect people uncomfortable with using the internet. This has convinced the Australian government that the internet is not always the right channel for everybody, since many Australians are currently satisfied with other channels of communication such as the telephone and face-to-face interactions (AGIMO, 2005, 8). It was found that the majority of

Australians, about 52%, preferred contacting the government in person, 26% favored the telephone and only 15% opted for the internet (AGIMO, 2005, 8).

In addition, people in remote areas with no or little access to electronic channels may feel socially aggrieved and offended if it is the only option for them (Mullen and Horner, 2004). Likewise, people with a disability must also be acknowledged and provided with facilitated electronic means. Teicher and Dow (2002) urged the Australian government not to discriminate between advantaged and disadvantaged people such as those living in remote areas, the disabled or illiterate, by offering disadvantaged people accessibility options such as text and Braille-based displays, video and audio clips. On the other hand, AGIMO (2005, 9) states that people will select the online channel only if it provides convenience in time, location and accessibility, and they are likely to make contact in person if they need to speak to real people and/or want to clarify or debate an official issue and ensure the highest level of accountability is reached.

Lesson Eight: *Plan to collaborate and integrate public services internally and externally, horizontally and vertically.* One of the biggest advantages of e-government is integrating government information and services in one portal, yet it is also the main challenge. AGIMO (2004, 130) declared that adopting a multi-channel approach – as previously discussed – could sometime inhibit the idea of building a perfect integration between processes, therefore a proper integration strategy must be in hand while developing means of communication. In general, the concept of integration covers the following main areas:

- internal horizontal back-end and front-end processes within a function of the organisation,
- internal vertical communication between different levels of the organisation,

- external horizontal processes between different organisations, and
- external vertical interactions with different levels of the government.

According to AGIMO (2004, 136), an integrated services approach across agencies horizontally and vertically is needed to meet users' expectations of e-government and hide the complexity of bureaucratic procedures of today's life. Despite this, many government websites in Australia lack genuine integration. Teicher and Dow (2002), declared that Australian portals lack real integration horizontally (agencies at the same government level) and vertically (across government levels). The authors saw that the only option available was connecting the citizen through hyperlinks to other agencies and department websites. In the USA, Reddick (2004) found that American municipalities' websites within the local government level are mainly informative in nature and still aiming for deeper internal changes and external collaboration. In addition, Beynon-Davies and Williams (2003) witnessed that many public authorities in the UK are focused on improving their front-end applications and little work is being done on the back-end process reengineering; they recommended a holistic approach that emphasises integration and balance in priorities between front-end and back-end systems. In this sense and according to a 2004 e-government workshop sponsored by United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2004, 12), integration has five main building blocks: lines of business, enterprise, platform, people and process.

On the other hand, many advanced governments failed to balance development among different levels of the government which critically affected the integration efforts. For example, Lee et al (2005) argue that federal and national level of e-government are more advanced in many highly-developed nations such as the USA and the UK, where the local level is still at an early stage of development. Teicher and Dow

(2002) found that the federal government agencies in Australia are more advanced in terms of e-government development programs than other government levels. The authors also declared that e-government in Australia lacks the collaboration across agencies and levels of government which would help in removing barriers between government agencies and department. In contrast, New Zealand is working on several e-government initiatives to offer users integrated e-services in one portal which enable them to provide information that is then distributed to applicable agencies and departments (e-government Unit, 2004, 3). Agencies in New Zealand are using several standards that facilitate information-sharing such as the e-Government Interoperability Framework (e-GIF) (E-government Unit, 2004, 4).

Lesson Nine: *Assess e-government infrastructure, projects, and know-how regularly to promote and guide improvements.* E-government plans and achievements need to be assessed regularly according to user needs to allow early identification of areas for improvement. According to Freed (2004), citizen satisfaction assessment programs in USA proved to be positively driving some government websites for improvements, especially when these programs pinpoint critical areas that promote user satisfaction. AGIMO (2005, 6) on the other hand, stresses the need to qualify staff to be able to handle services physically and online. In an earlier publication, AGIMO (2004a, 101) defined how return on investment can be calculated for e-government initiatives in an aim to justify benefits and costs. The same source explained that e-government return on investment (ROI) equals Agency Value plus Social Value minus Adjustments for Risk. Besides, Lee et al (2005) state that the new progresses in ICT such as WiFi (Wireless Fidelity), VDSL (Very high bit rate Digital Subscriber Line), and mobile computing will further open new development opportunities for e-government builders to meet and improve users' needed services. Moreover, UNESCAP (2004, 23)

emphasised that measuring return on investment for e-government projects is crucial to generate higher leadership support and user adoption.

4.6 Summary

This chapter aimed to identify the barriers to the adoption and dissemination of e-government through examining worldwide experiences in this domain. Advanced nations such as Australia, the UK and the USA as well as developing countries were investigated.

Nine key lessons have been learned from such advanced nations' experiences in this regard. Time, public awareness and education campaigns are key solutions to many adoption concerns. That is, users must be informed and educated about where to find and how to utilise the initiatives, and time is needed to test them. More importantly, users' first impressions about the online services may highly influence adoption rates through word of mouth. In other words, government must ensure proper development of its e-government websites before initiating any marketing campaigns, carefully select services to be offered that meet user needs, and emphasise user-friendly interfaces. This will aid in guaranteeing successful experiences for users and avoid any possible negative stereotyping.

Most e-government initiatives, even in some advanced nations like Australia, started by replicating physical government departments online with mainly informational websites. Such a development approach would be suitable for the short term as the country sought to increase people's awareness and knowledge of e-government, but was proved to be problematic in the long run as users might find it hard to remember how to locate and interact with the needed agency or service. Awareness campaigns are needed to spread the word about e-government and initiatives must be

undertaken to provide disadvantaged people with affordable and easy-to-use internet access. For example, the State of Victoria in Australia initiated a statewide project aiming to provide people with free to inexpensive internet access (i@, 2005). On the other hand, people in general are seen as susceptible to stereotyping and an obsession with security. Building positive stereotypes can be achieved by offering users solid and advanced e-solutions when they have low expectations. Making positive first impressions will always help to spread adoption through word of mouth recommendations. On the other hand, people should know more about the available e-laws and that they are protected by the law. Government agencies must seek to provide users with reassuring facilities such as receipt numbers and/or receipt printout, or save options online to act as proof of formality for security-conscious people. Chapter seven uses the findings from this chapter to build concrete conclusions for the Oman e-government project. It also explains the implications of the lessons learned for the Oman situation.

The following chapter (chapter five) is the first of three that together address the Oman case study. Chapter five aims to describe and analyse the current status and plans in Oman for developing and improving the ICT sector and e-government. Chapter six is directed at analysing the surveys and interviews, while chapter seven uses the previous chapters to introduce the major outcomes of the study.

5.0 Oman Case Study: Background

This chapter is the first of three that together aim to document and analyse an ICT case study in Oman. As illustrated earlier in chapter three section 3.3, here the study uses the information and government publications gathered through the case study and literature review to provide a general background on Oman with an emphasis on the status of its ICT sector. To better illustrate Oman's stage of development, information regarding the country's politics, geography, population, and economy is provided. The status of the ICT sector in Oman is described, including its strategies and plans, infrastructure and current applications. Finally, there is a detailed description of Oman's current e-government initiatives.

5.1 Overview of Oman

The Sultanate of Oman, together with the United Arab Emirates, the Kingdom of Saudi Arabia, the States of Qatar and of Kuwait, and the Kingdom of Bahrain, comprise the GCC. The GCC was formed in 1981 to develop coordination, integration and inter-connection between Member States in all fields, strengthening ties between their peoples (GCC-SG, 2005). The GCC region is considered the richest worldwide in terms of oil with an estimated Gross Domestic Product (GDP) of US$324.36 billions in 2001 (GCC Statistical Department, 2005).

Oman occupies an area of 309,500 square kilometers (Ministry of National Economy – Oman, 2003a). It shares borders with United Arab Emirates to the north-west, the Kingdom of Saudi Arabia to the west, the Republic of Yemen to the south and the Arabian Sea lies eastwards. Oman's real renaissance began with the accession of His

Majesty, Sultan Qaboos bin Said Al Said to the throne on 23 July 1970 (Ministry of Information – Oman, 2005).

The following section describes Oman's geography, population and demographics, political system, and economy.

5.1.1 Geography and Regions

Oman is located in the south-east of the Arabian Peninsula next to Saudi Arabia and the United Arab Emirates. Oman is divided into three main governorates and five regions with Muscat as its capital city. According to Ministry of Commerce and Industry - Oman (2003), Oman occupies 309,500 square kilometers. Figure 5-1 shows the different regions and governorates in Oman as follows:

Source: http://www.omanet.om/arabic/regions/MAP.asp

Figure 5-0: Oman's regions.

- Muscat governorate is located in the north-east of Oman and contains Muscat City, the capital of Oman.
- Dhofar governorate is situated in the south and it has nine wilayats (townships).

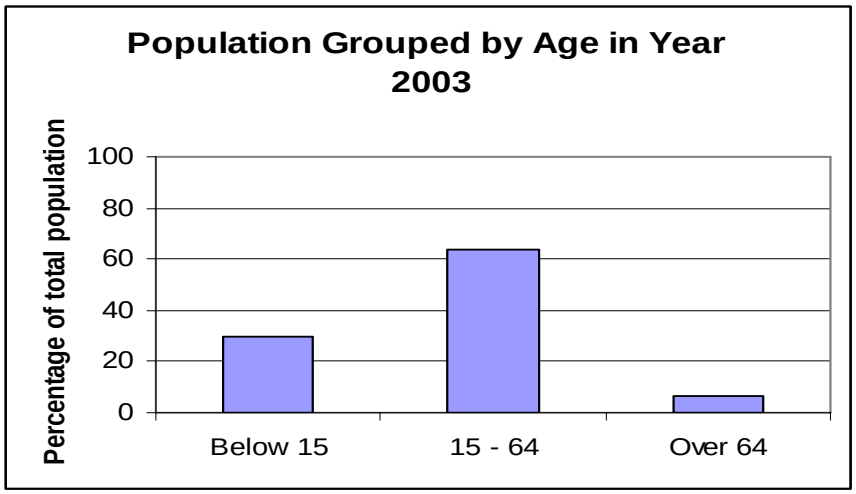
- Musandam governorate in the far north faces the Strait of Hormuz, regarded as one of the busiest shipping lanes in the world. It has four wilayats.
- AlBatinah region extends from Muscat to Musandam along the coast, with twelve wilayats.
- A'Dhahira region is located in the north-west of Oman and contains five wilayats.
- A'Sharqiya region has eleven wilayats and is situated in the eastern part of Oman.
- A'Dakhliya region is located in Oman's interior, having eight wilayats.
- AlWusta region occupies the country's centre, with four wilayats.

5.1.2 Population and Demographics

According to the latest census (Ministry of National Economy - Oman, 2004), in 2003 Oman had a population of 2.34 million people, a growth rate of 2 per cent and a density of 7.6 persons per square kilometer. However, nearly 559,260 residents, 23.7 per cent of the population, were expatriates (Census Administration, 2004). Males exceeded females at a ratio of 128 males to every 100 females, and in the Muscat labour force; gender differences found in the 2003 survey of 78.6 per cent male and 26.5 per cent female (Census Administration, 2004).

The majority of Omanis (63.6 per cent) lie within the 15 to 64 years of age cohort as shown in Figure 5-2. The illiteracy rate among the Omani population was 17.8 per cent in 2003 compared to 31.8 per cent a decade earlier in1993, illustrating over the period the importance Omanis placed on education. Table 5-1 provides a comparison in literacy rates among Omanis, grouped by their educational level. On the other hand, Figure 5-3 depicts the general distribution of population within the different governorates and regions in Oman. AlBatinah has the greatest population concentration of the Sultanate with 28 per cent, Muscat is second with 27 per cent and AlSharqiyah

comes third, having 13.4 per cent of Oman's population. Regarding non-Omanis, Muscat has the greatest concentration of expatriates with 44.8 per cent, AlBatinah is second, 15.9 per cent, and Dhofar third with 11.6 per cent. The majority of Omani nationals, 31.7 per cent, are in AlBatinah region followed by Muscat with 21.4 per cent.



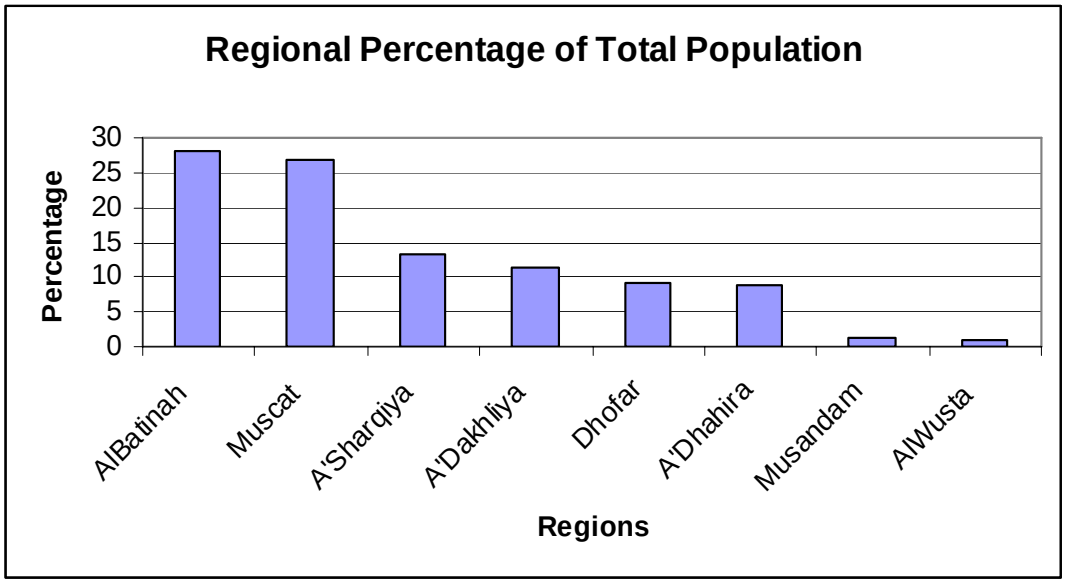
Source: Census Administration (2004)

Figure 5-1: Oman's population grouped by age

Table 5-1: Educational level of Omanis - frequency distribution

Educational Level	**Year**	
	2003	1993
	Per cent	Per cent
Illiterate	17.8	31.8
Read and Write	19.8	27.9
Elementary Education	20.9	21.5
Preparatory Education	17.5	10.4
Secondary Education	17.9	5.5
Diplomas and Technical degrees	2.5	1.5
Bachelor's degrees	3.1	1.1
Master's degree and Doctorate	0.3	0.1
Unidentified	0.2	0.2
Total	**100**	**100**

Source: Census Administration (2004)

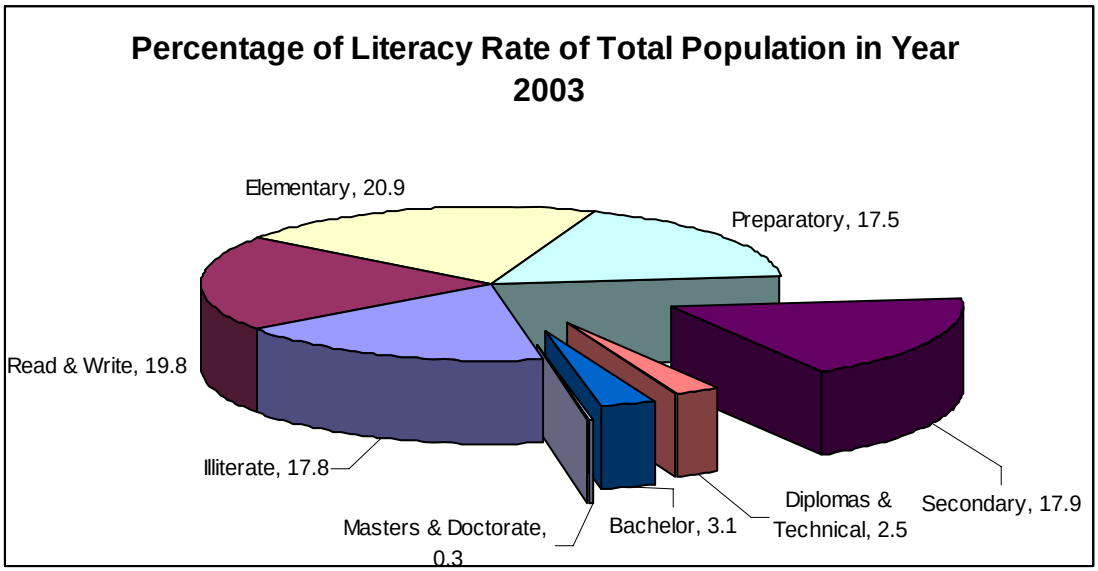


Source: Census Administration (2004)

Figure 5-2: Population distribution in Oman regions

As noted earlier in chapter three section 3.3.2.1, the most likely early adopters to e-government initiatives in Oman are residents with reasonable levels of education and / or income. Few Omanis, some 105,110 or 5.9 per cent of the population, hold post-secondary educational qualifications. From these statistics, Figure 5-4 shows the percentage of Omanis most likely to use, or be targeted for, e-government applications. However, as discussed in the previous chapter, secondary school graduates have been included in the study as possible initial e-government users because general education in Oman only at this level includes computer courses. Therefore, the total percentage of Omanis who are most likely to adopt e-government initiatives is 23.8 per cent (5.9 per cent plus 17.9 per cent) of the total 1,781,558 Omanis, which equates to about 424,011 people. Moreover, since the researcher has undertaken a case study with participants working or studying in Muscat area only, this confines the study to citizens living in Muscat who share the identified characteristics of education and / or income. Accordingly, the new Figure will be 34.9 per cent, or 133,183 people according to Census Administration (2004) that represent Omanis living in Muscat who meet the

predefined criteria. This Figure represents the segment of the Omani population that is covered by this study's external validity as discussed in chapter three section 3.5.



Source: Census Administration (2004)

Figure 5-3: Predicted early e-government adopters in Oman

5.1.3 Political System

Oman is a peaceful country, having a stable economy and a hospitable culture. Sultan Qaboos bin Said Al Said is a well-known peacemaker in the region, receiving the International Peace Award awarded by the National Council on US-Arab Relations in 1998 (Ministry of Information – Oman, 2005).

Oman's government system is a monarchy (OCIPED, 2005a), and Sultan Qaboos bin Said Al Said has ruled Oman since 23 July 1970. The Sultan also heads the Defence Council, responsible for the security and wellbeing of Oman; the Financial Affairs and Energy Resources Council, responsible for setting Oman's fiscal policy and monetary regulations; and the Supreme Judicial Council, responsible for setting general judicial policy. Oman is divided into governorates and regions. Each governorate is headed by *Muhafed* (a governor) and the different regions are headed by different

Walies (mayors), each of whom is responsible for a certain township or *Wilayat* within that region.

5.1.4 Economy

Oman's currency is the Rial, about $US2.60. The country's main revenue comes from oil and natural gas. According to the Ministry of National Economy – Oman (2003a), Oman's 2002 GDP reached OMR7803 million (provisional), compared to OMR 104 million in 1970. The country's economic status was substantially enhanced by rising oil prices (Ministry of National Economy – Oman, 2003).

Oman's 1970 renaissance was assisted by the 1976 implementation of five year development plans, which aim to enhance the citizens' wellbeing. The earlier five year plans focused on meeting the basic needs of the country as a whole; education, health, transport, and telecommunication. These development plans continue today and they underpin Oman's economy as it progresses smoothly through consecutive and complementary programs. For example, the sixth five-year development plan (2001 – 2005) emphasised the growth of fixed and mobile telecommunications and internet services (OCIPED, 2005a).

In 1995, the government developed a long term, 25-year development plan, *Vision 2020*. Using this framework, the country started a diversification strategy, aimed at reducing reliance on the oil sector, by replacing oil with natural gas, and identifying and promoting other local industries. ICT was seen as a facilitator for many of the Vision's goals. The focus of Vision 2020 is to develop the economy – promote external economic relationships, diversify Omani industry and develop a robust economy that has professional leadership and a skilled labour force. Privatisation of government-held resources is another aim embedded in Vision 2020. It includes divesting government properties and offering the private sector opportunities to further develop post-public

enterprises. OmanTel, the sole provider for ICT services in Oman, is a case in point. Privatisation of this public entity was accelerated when Oman joined the World Trade Organisation (WTO) in 2001, as free trade and liberalising the communications sector was an agreed condition of this step. Oman has also established free trade zones and industrial estates to promote local and foreign investment. These programs offer incentives to investors, such as 100 per cent foreign ownership for any projects established within the free trade zone boundaries. Further incentives include exemption from customs fees for any imported or exported products, and removal of restrictions on company profits or money transfer and investments (OCIPED, 2005a).

5.2 ICT Sector in Oman

The ICT sector in Oman and the GCC countries is at an early stage of development, but it is quickly gaining momentum. According to Ernst & Young (2002), a survey conducted in 2001 by NFO MERAC, a leading regional market research firm, showed that nearly 17 per cent of the GCC's population reported shopping online and that they spend on average $US1068 per year with business-to-consumer electronic commerce (B2C) with a trade value of $US480 million. This substantial level of internet purchasing surpasses that of some developed nations, such as Australia. In 2001, ten per cent of Australians bought goods and services over the internet and the average on-line purchase was $US285, with the B2C trade value at $US380 million (Ernst & Young, 2002). Much of the other material presented in this thesis would suggest that these results should be treated with considerable caution, as most research suggests that e-readiness and e-commerce diffusion in developed, western countries (and Australia specifically) is considerably more advanced than in the GCC. However, this research does seem to indicate that there is considerable upside. For example, Ernst and Young further estimated Oman's B2C trade at $US22 million in 2002 and projected it to reach

$US44 million in 2005. It also projected Oman's business-to-business (B2B) internet trade value to reach $US193 million in 2005. Informed comment from such respected global sources reinforces the substantial opportunities and growth potential for e-commerce applications in the region.

5.2.1 Overview

The United Nations Economic and Social Commission for Western Asia (ESCWA, 2003) described Oman's ICT policies and strategies as having, on average, clear ICT plans and objectives and that it has assigned a specific national entity to achieve its goals and the country has allocated financial resources to ICT projects. Further, ESCWA commented that Oman exhibited good political leadership in producing a clear ICT strategy, a clear ICT operational plan and strategies for both ICT research facilities and technology incubators. In addition, the United Nations body noted there were opportunities for improvement in Oman's ICT infrastructure, including further development of research facilities, telecommunications, and the technology incubator initiative.

Internationally, Oman has met its regulatory obligations. It is a member of the WTO and in 1999 signed the Paris Convention for the Protection of Industrial Property, and later in 2001, the Patent Cooperation Treaty (PCT). ESCWA (2003) acknowledged Oman's position of having ICT-specific Intellectual Property Rights (IPR) legislation in place by meeting the following standards:

- Oman is committed to abide by the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPS)
- the nation has a legislative environment that is continually under review, and
- it shows real commitment to enforcing its legislation.

As another aspect of ICT development, ESCWA (2003) identified and analysed Capacity-Building in participating countries, including Oman. The United Nations entity measured progress according to the following variables: Awareness and Dissemination, Computers in Schools, Vocational Training, University Education and Research, Development and Innovation (RDI). ESCWA ranked Oman efforts as average in acknowledgement of the country's ICT awareness campaign, university and vocational training programs, encouragement of information and communications industries, and that it has a measurable RDI output of projects and publications.

For the ratio between teledensity (telephone subscribers/population) and internet penetration (internet subscribers/population), Ernst and Young (2002) ranked Oman after other GCC countries. The study also found that PC penetration was quite low in Oman at 3.24 PCs per 100 population members and confirmed Oman's telecommunications service as a monopoly. The Omani government has plans to liberalise the ICT market and privatise the public telecommunications service as described in the next section. Ernst and Young (2002) concluded that, at the time, Oman's ICT development lagged some three years behind leading countries like Australia, UK and Singapore.

Skilled ICT workers are scarce in Oman and are reluctant to join the private sector and/or start their own businesses. In 2002, only 876 skilled Omanis worked in 52 private companies (Ministry of Manpower, 2003); the total number of people working in the ICT field in both the public and private sectors was five times that number. A more recent survey by the Ministry still found only 31 private sector ICT firms, and they work in either applications production or promotion, or both (Ministry of Manpower, 2005). The Ministry (2003, 2005) identified the following challenges to explain the low dissemination rate:

- absence of an independent ICT entity to regulate and monitor the sector
- lack of ICT sector support from public and private institutions
- Oman's IT graduates do not meet the labour market's required skills levels
- insufficient resources for ICT courses within higher education and vocational training
- general education course content lacks crucial English language and mathematical skills necessary for ICT graduates
- a plentiful supply of qualified and experienced immigrant ICT workers competing for work
- inequity between public and private sector employees, with government employees having superior working conditions

As a corollary to the Ministry of Manpower's findings, ESCWA (2003) described Oman's initiatives to build its ICT sector as low. Consequently, the ESCWA survey concluded that Oman was at an early stage of ICT development, with few private sector firms in the industry and those mostly engaged in import of goods and services. The United Nation's group findings were that, with the exception of telecommunications, there is low IT investment in Oman and that there is insufficient government support to develop the ICT sector appropriately (ESCWA, 2003).

To assist in removing these barriers and to enhance the ICT sector in Oman, the Ministry of Manpower (2003, 2005) recommended the following actions:

- amend trade legislation/regulations to promote foreign ICT investment
- address structural issues impeding development; preferred initiatives include: an on-line legislation and regulations database, extend fibre optic networks, implement a payment gateway to facilitate e-payments, improve internet broadband technologies such as Asymmetric Digital Subscriber Line (ADSL)

- foster IT education in schools to enhance computer and internet literacy.

The following sections describe in detail Oman's vision and strategies in developing and enhancing the ICT sector, the status of its ICT infrastructure, and the leading IT applications in the country.

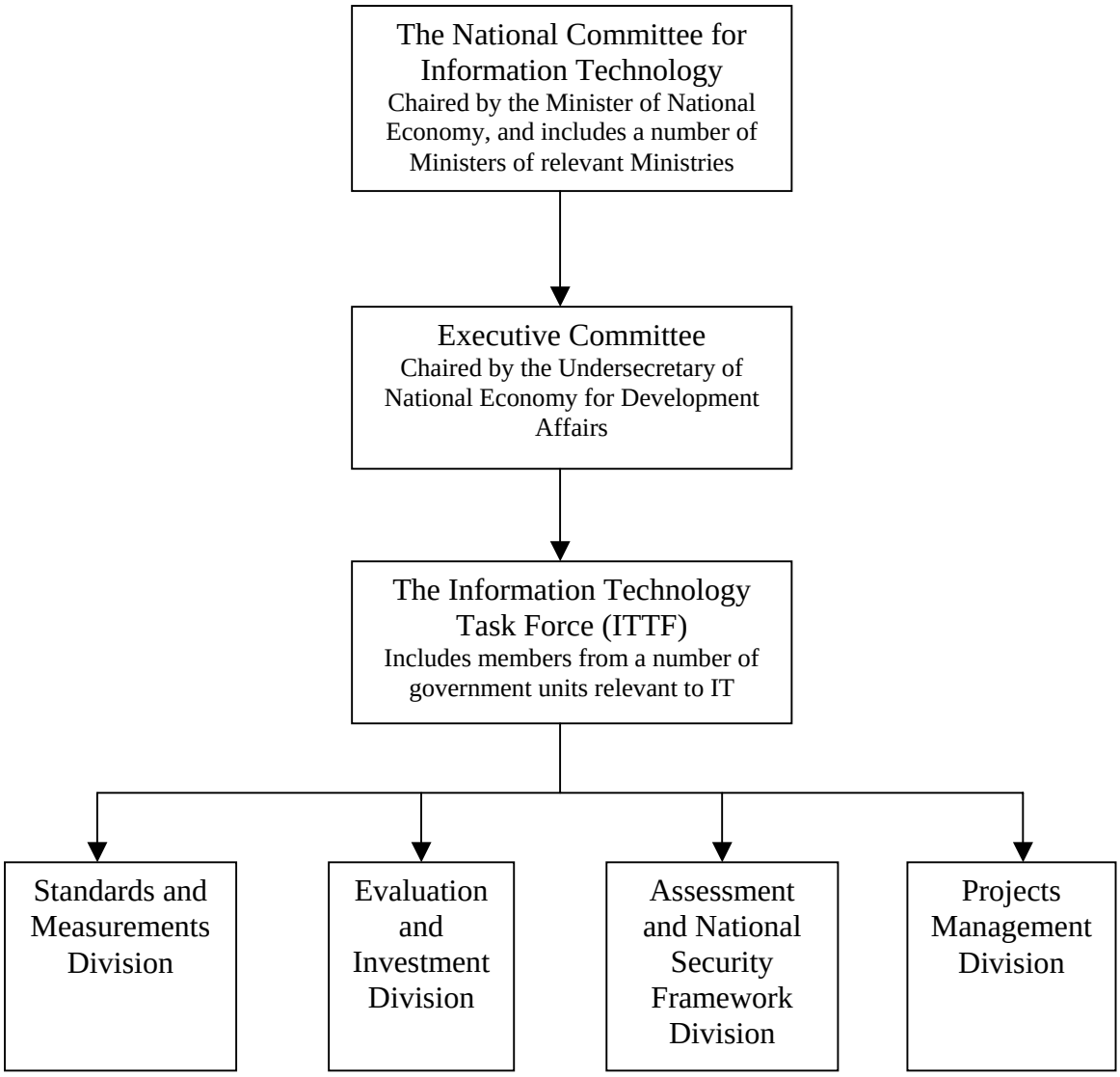
5.2.2 ICT Vision and Strategy

The National Committee for Information Technology was established in 1998 to address issues in Oman's information and communications sector. The Committee is chaired by the Minister of National Economy and includes relevant Ministers, illustrated by Figure 5-5. In April 2000, the Committee formed the Information Technology Technical Secretariat (ITTS) within the Ministry of National Economy, and the Information Technology Task Force (ITTF) (AlEsmaeli, 2002), to develop an IT vision for Oman. ITTF operates within ITTS that is currently supervised by the Ministry's Undersecretary for Development Affairs. The Task Force's deliberations produced the following statement:

> *The leveraging of Information Technology & communications in providing collaborative services to public & private sectors and citizens through electronic means as being the driving force to move forward the Sultanate to the Knowledge Based Economy and achieve sustainable development.*
>
> (National Committee for Information Technology – Oman, 2003).

The Ministry of National Economy – Oman (2003a), has established the following goals to achieve this vision:

- develop a national database and link it to the global infrastructure
- utilise ICT to improve the flow of relevant data and services to public and private organisations



Source: Ali (2003)

Figure 5-4: Structure of the national IT committee in Oman

- support the private sector's commitment and resources in the sector
- address the issue of cost to users to provide ICT services to all levels of society.

To achieve these goals, the following strategies were set according to (Ministry of National Economy – Oman, 2003a):

- formulate a national IT strategy as described in the next paragraph
- establish a legislative structure in an appropriate Ministry to facilitate issues such as authentication, liability, access to records, privacy, procurement, and e-payment
- design the ICT legislative framework to encourage private participation

- continually review ICT standards to ensure relevance to the country's needs.

The ITTS was then directed to develop a National Strategy for Oman, and the Task Force worked collaboratively with IT consultants Gartner Group on the matter. In May 2003, a strategy was produced, establishing an ICT framework and a priority list of projects and programs (National Committee for Information Technology – Oman 2003):

- advancing the telecommunications infrastructure and producing e-payments
- implementing both a government information and e-forms portals
- developing a 'one stop shop' project intended for company registration and related matters
- enhancing information security, laws and legislation pertaining to electronic transactions
- improving IT awareness and reducing the 'digital divide'
- incubating diversified and comprehensive IT organisations
- developing an independent structure to carry out the implementation of the strategy.

The general aim of the IT strategy is to achieve a digital society in Oman (e-Oman), of which e-government is a subset of this general target. The following strategy phases have been identified.

- **Developing laws and legislation pertaining to online transactions:** According to the Ministry of National Economy – Oman (2003a), legislation was promulgated in March 2002 to enable the appropriate development of the ICT sector. The legislation included the establishment of the Telecommunications Regulatory Authority (TRA) to implement and monitor a regulatory framework for the sector and to facilitate development of the ICT sector. The TRA is currently responsible for issuing licences for internet and mobile service providers and will extend its operation to cover fixed infrastructure and, later, value-added services. Moreover, a

tender was issued at the beginning of 2004 with the aim to encourage specialised law companies to participate in the development of e-legislation and tailor it to Oman. The project was awarded to a local law firm called 'Said Al-Shahri Law Firm' that works in partnership with a British law firm specializing in telecom laws. The project involves two phases; the development of e-transactions laws and a gap analysis between this and the existing laws in Oman. In addition, a Real Time Gross Settlement (RTGS) project initiated earlier by Central Bank of Oman (CBO) in collaboration with Hewlett Packard (HP) is being developed to aid in the establishment of an e-payment infrastructure in the country (AME Info, 2005a). The issue is still being discussed by CBO, ITTS and other related ministries.

- **Designing and building a national telecommunications network:** OmanTel submitted a quotation to ITTF in early 2004 for the development of a comprehensive MPLS based (Multi-Protocol Label Switching) network that connects all government organizations, and this is currently under evaluation. If approved, the work will be outsourced to OmanTel for some $US130 million. Later, the government will pay OmanTel a fixed amount for its desired bandwidth requirements for an agreed period.
- **Training, educating and raising IT awareness:** An IT park, Knowledge Oasis Muscat (KOM), was created to accelerate the development of ICT in Muscat and Oman generally. Essentially, KOM is a technology park that offers more than 12,000 square meters of office and enterprise incubator space, together with campuses for two leading IT colleges. KOM's management targets local and foreign investment in IT and encourages non-government IT organisations to utilise its facilities. It offers many benefits and incentives for the private sector: high bandwidth to 155mbps, no personal income tax and no foreign exchange controls,

tax and import duty exemptions and freedom from company income tax for five years (with the option of renewing for another five years). In addition, the Knowledge Mine (part of KOM initiative), offers business and employment opportunities for IT graduates and skilled workers. Knowledge Mine offers start-up firms three years of mentoring and administrative support, free rent for the first six months and flexibility in meeting other enterprise needs (Alwatan, 2004). Also for Omanis generally, international organisations such as Oracle and Microsoft have been contracted to provide IT training and there are plans for secondary government schools to provide computer courses. In addition, the government has adopted the 'International Computer Driving Licence' (ICDL), as a minimum requirement for all public employment recruitment. The Ministry of National Economy – Oman noted that in 2005, 381 schools provide on average three classes each week for level 11 students in general education, facilitated by the government's provision of PCs, software and internet access. (Ministry of National Economy – Oman, 2003a). The Ministry further reported an emphasis on IT programs at tertiary level educational establishments and studying opportunities at international institutions for exceptional students. The Ministry of Manpower is increasing resources to train and employ Omanis in the ICT field; in 2003-04 there were 361 secondary and tertiary graduates of 46 programs related to ICT (Ministry of Manpower, 2005). One thousand nine hundred and fifty-five Omanis have graduated from these programs in the four years from inception in 2001, with another 4000 expected to graduate by 2008. The Ministry of National Economy has also contributed to this initiative. It provided 50 citizens with scholarships to Malaysia (20 graduates), Singapore (16 graduates) and Australia (14 graduates) for diplomas in IT (Ministry of Manpower, 2005). The international company Shell, through its Oman office, has contributed

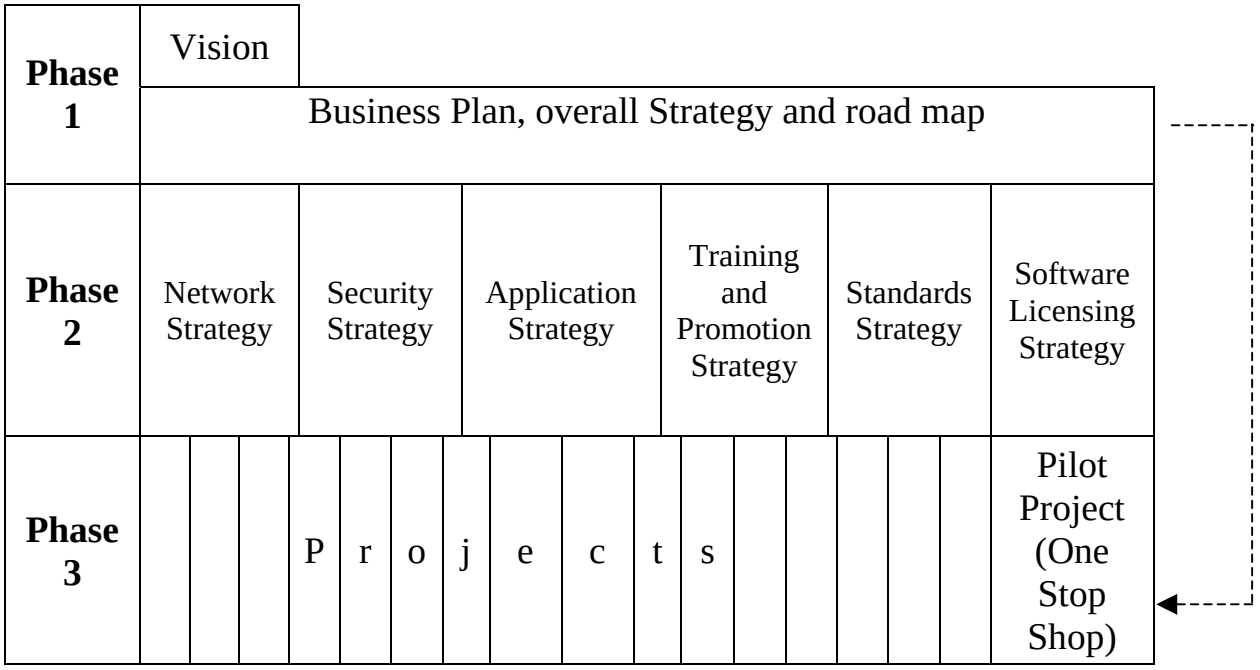
$US150,000 to the training of 3000 secondary school teachers. The Omanisation rate (the rate that Omanis are being trained to replace foreign labour) in the ICT sector within private organisations has improved from 25 per cent at end of 2002 to 29 per cent in 2004. Despite this, the increase in the Omanisation rate was not witnessed in highly skilled IT positions but rather in the non-technical jobs that require little specialised knowledge.

- **Supporting the private sector:** The government believes that the private sector can play a major role in technology diffusion, and encourages private companies to explore higher technology initiatives, actively considering the adoption of any successful e-initiatives developed in this way. For example, the Ministry of Commerce and Industry uses the Oman Arab Bank's 'smart cards' to facilitate cash transfers. This initiative allows the bank's own customers to use their smart cards to pay for the Ministry's services. Muscat Municipality has taken up this idea and is exploring opportunities with its local banks.

As depicted in Figure 5-6, ITTF has set the following sub-strategies to achieve e-Oman (AlEsmaeli, 2002).

- **Application Strategy:** In 2002, a researcher for Gartner Group (T. Murphy) studied the extent to which ICT was integrated through the Oman public sector (Murphy, 2002). His findings were that government entities did not have a common framework for their information and communication needs and there was no technical or process integration for existing public sector information applications. The ITTF's strategy is to use an e-government framework for specialised application development by each ministry and government institution to allow for full integration between agencies. This level of integration includes all processes and services offered to the public and to the private sector. A major assessment of

the current systems and databases (manual and electronic) in and between each public organisation will precede strategy implementation.



Source: AlEsmaeli (2002)

Figure 5-5: ITTF planning approach for e-Oman

- **Network Strategy:** The ITTF will establish a central ICT network with sufficient speed and capacity to provide for foreseen applications. Again, a thorough survey of existing Oman networks, including infrastructure, will be undertaken, prior to the preparation of a major plan for the national network and its associated infrastructure.
- **Security Strategy:** In 2002, Murphy also found that existing legislative structures did not provide sufficient security for e-Oman's growing ICT sector (Murphy, 2002). The ITTF's strategy is to set a solid security framework with the adoption of appropriate and enforced legislation and regulations to support users' confidence in their online transactions and activities.
- **Standards Strategy:** The adoption of this strategy by the Task Force sets the criteria by which all public sector ICT projects are assessed and developed. The

strategy includes provision for the regulations and policy requirements for information systems.

- **Training and Promotion Strategy**: In this case, the aim is to build a skilled labour force to allow Oman to achieve self-sufficiency in the ICT field. The plan seeks to train all Omanis in the use of computer-based technology and telecommunications; it also promotes the previously-discussed foreign and local investment initiatives in ICT.
- **Software Licensing Strategy:** The ITTF intends to establish policies for the Ministries' acquisition of international software licences and to use this combined purchasing power to negotiate favourable pricing structures for future negotiation of contracts. It will set criteria to allow licence-sharing between government institutions.

In order to achieve these strategies, the government adopted the following activities as part of the sixth five-year development plan (2001 – 2005) (Ministry of National Economy – Oman, 2003a):

- Allow competition into the communications market by privatising the existing government communications organisation. In July 1999, as preparation for this step, Sultan Qaboos bin Said Al Said issued a royal decree to convert the General Telecommunication Organisation (GTO) from a purely government organisation into a public-owned company, OmanTel, and in June 2005, the first 30 per cent of shares in OmanTel were released for sale to the public. Competition in telecommunications was further enhanced in 2004, when a separate telecommunications company, *Nawras*, was established to offer mobile services to Omani citizens. Nawras is a combined venture between Qtel (a fixed and mobile

telecommunications provider in Qatar) and TDC (a leading telecom operator in Denmark), together with Omani partners (Nawras, 2005).

- Diversify and launch new communication services. New fixed and mobile services were continuously introduced as described in Section 5.2.3, Infrastructure.
- Encourage Research and Development (R&D) collaboration between government, universities and the private sector to bring ICT research from a low level of activity. As discussed previously, KOM and Sultan Qaboos University (SQU) are encouraging initiatives in this area, focusing on call centers and software and hardware application development, but response is low. Professionals working in ICT are considering the establishment of an Oman Computer Society and/or an Omani ICT Association to provide a forum for R&D discussions and views on Oman's ICT (Ministry of National Economy – Oman, 2003a).
- Further development of the national database, integrating public records such as demographic information and Geographic Information System data.
- Developing robust security measures to cope with international threats. The Royal Oman Police have introduced an internal security system, the Civil Status system, launching a new 'Smart Card' identification program for citizens. This is described later in the Section 5.3, e-government in Oman.

5.2.3 Infrastructure

According to ESCWA (2003), ICT infrastructure in Oman was described as achieving the following standards:

- Oman has successfully reduced differences in standards of telecommunications service between rural and urban areas
- telecommunication infrastructure and equipment is available on a limited scale, and

- telecommunication improvements are underway.

In addition, ESCWA ranked Oman's telephone density as being average, the standard of its international telephony and internet structural links were classified as developing, and the country's internet penetration was also average. A year earlier, however, Ernst & Young (2002) considered Oman had a "low infrastructure readiness" and recommended that the government should attend to the following issues as a matter of priority:

- develop e-commerce laws, robust security measures and B2B payment infrastructure
- establish an independent telecommunication regulator to encourage competition among the internet service provider (ISP) market, and
- increase awareness of e-commerce benefits within the private sector.

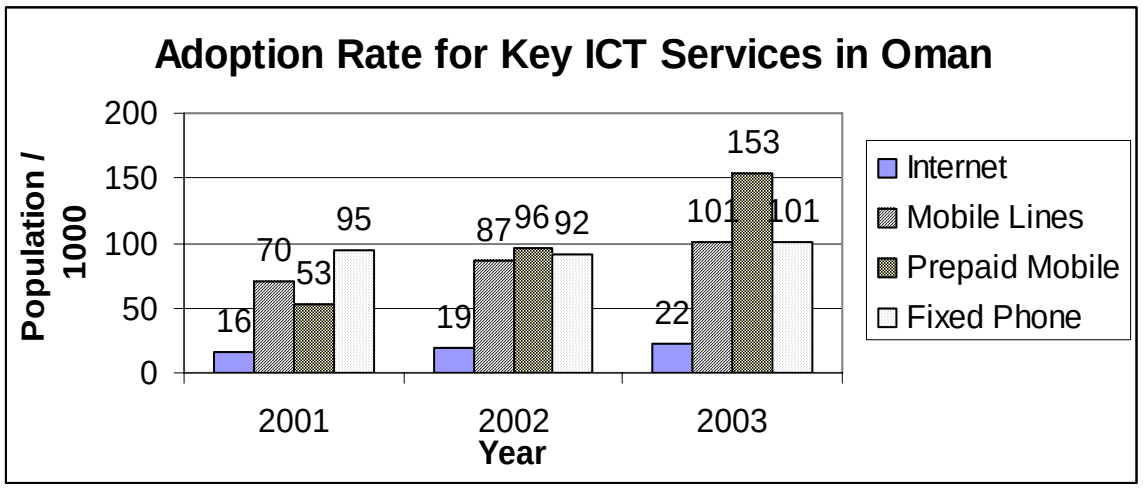
The following paragraphs describe these issues in more detail.

As described above, Oman had only one service provider for both mobile and fixed telecommunication services before 2004, when Nawras became a second provider, although it offered mobile services only. No further telecommunication services have been introduced in Oman other than as described by the Ministry of National Economy in 2003 (Ministry of National Economy – Oman, 2003a), which were:

- full digital network (digital switches and inter-exchange fibre optic transmission links).
- digital data network for connecting Oman's business and financial centers
- global system for mobile telephones (GSM) network with roaming capabilities to provide services for over 100 operators in 53 countries, featuring mobile telephone data, fax, and SMS
- value-added services for fixed and mobile services such as call conferencing, call waiting, prepaid calling cards, paging, and voicemail

- internet dial-up, leased line, and ADSL services
- Advanced services such as asynchronous transfer mode (ATM), integrated services digital network (ISDN), wireless local loop (WLL), and very small aperture terminal (VSAT).

There was some discrepancy among reported findings on the country's ICT adoption rate. For example, the Ministry of National Economy – Oman (2003a) reported that by the end of April 2003, there were 235,105 fixed phone lines in Oman, 228,483 mobile telephone subscribers, 277,759 prepaid mobile subscribers and internet subscribers exceeded 50,000; whereas on its website, (Ministry of National Economy – Oman [2003]) these totals were slightly different, as shown in Figure 5-7.



Source: Ministry of National Economy – Oman (2003)

Figure 5-6: Adoption rate for key ICT services in Oman

Despite this discrepancy, there was a clear trend that numbers of mobile services subscribers have continually increased since the launch of these services in 1996. Prepaid mobile services and SMS were introduced in 2001 and both are popular with subscribers. The internet became available to Omanis in January 1997 with 4,163 subscribers at the end of the first year, but despite subsequent increases in subscriber numbers, the penetration rate was lower than that expected, according to ESCWA

(2003) and as shown in Figure 5-7. Moreover in April 2003 (Ministry of National Economy – Oman, 2003a), internet leased-line subscribers (a high bandwidth always-on internet connection available for an annual fixed fee) exceeded 100, and there were more than 150 internet cafes operating in Oman. The current internet infrastructure capacity is over 310Mbps that includes 2 STM1 through Sea-me-we3 and FLAG cables. In addition, multimedia message services (MMS), general packet radio service (GPRS) and WAP were introduced later at the end of 2004.

According to Census Administration (2004), 99.1 per cent of residences in Muscat and the AlBatinah region use electricity, although this rate decreases in other areas and ranges from 98.6 per cent in A'Sakhilyah to 87.5 per cent in AlWustao. This indicates that basic infrastructure is not yet complete in the rural areas and further options for ICT services should be made available for rural communities. For example, Murphy (2002) suggests that OmanTel should consider satellite and multichannel multipoint distribution service (MMDS) as options to internet broadband for rural areas.

On the other hand, E-government researchers Gaber and Rizoqi (2003) investigated internet usage by non-ICT sector mangers in government organisations and found that:

- 67 per cent of government institutions are connected to the internet
- email constitutes the greatest use of the internet and very few managers utilise it for better productivity
- lack of resources and low internet skill levels are the major reasons for low internet usage rates
- 62 per cent of government organisations have an established website, whilst the remainder is in the development stage of their websites.

OmanTel is developing and upgrading its services to reduce rates to its telephone and internet subscribers, an instance being its participation in a Falcon submarine cable venture, a high-capacity loop cable system that extends from the Middle East and Egypt through India to China, with Muscat as one of the hub cities. Flag Telecom, a leading global network services provider, funded the project together with India's Reliance Infocomm (AME Info, [2004a] and Alwatan [2004b]). This extra capacity was instrumental in increasing the number of Omani internet subscribers from 33,348 in May 2001 to 44,251 in May 2002 (Almanthari, 2002). Again, these observations vary from those of the Ministry of National Economy above. Almanthari shows that although the Muscat area had the greater subscriber numbers increase, other regions in Oman also benefited from the initiative, as AlBatinah region increased by 14 per cent, Dhofar and A'Dakhliya by 9per cent, and A'Sharqiya and A'Dhahira by 6 per cent.

5.2.4 ICT Applications

From the commencement of the ICT strategy a decade ago, Omanis continue to embrace telecommunications and computer technology, particularly in the business sectors. They realise the importance of adopting new technology, both for strategic competitive advantage and for efficient daily operations. ESCWA (2003) assessed ICT applications in Oman according to: maturity of e-commerce (volume, availability and spread of online services), and the availability and quality of online banking. The United Nations representative indicated that Oman has developed strategies for e-commerce and there was evidence of successful implementation. However, ESCWA observed that there were pockets of Omani society that had not benefited from these actions and that e-commerce initiatives could not be utilised throughout the country.

In addition, ESCWA (2003) assessed ICT applications in healthcare in Oman, using the following criteria: availability and connectivity of a national healthcare database and the use of telemedicine and teleconferencing services. Oman was seen to have plans and strategies in this regard but with limited implementation. The usage and impact of specialised Digital Arabic Content (DAC) was another element examined by ESCWA using internet penetration, instances of digital Arabic content and the level of Arabic web hosting as variables. It concluded that Oman's internet usage of DAC is low compared to other countries in the region. Web hosting with Oman's country code as part of a domain name was low, but on average, comparable with similar regional nations.

In education, ICT applications in Oman were measured according to the following criteria: computer-based education, educational institute connectivity, online services and distance learning (ESCWA, 2003). It was found that it had undertaken planning for ICT in education but implementation was lacking. Section 5.2.2 above discusses subsequent actions by the Oman government to fulfil its obligations in computer literacy and encouraging Omanis to become ICT professionals.

Oman achieved world prominence for its use of new technologies when personal digital assistants (PDA) were used to collect data during the national census in 2003 (Hussein, 2004). In April 2004, the Ministry of National Economy, in collaboration with the UN Statistics Division and ESCWA, conducted a workshop on the outcomes from this action (Ambosaidi, 2004a). PDAs enabled census employees to send data wirelessly to the central database at the Ministry. As an initial step, the devices were used only in the capital area, Muscat, and proved to be successful. More than 1200 PDA devices were used. Moreover, Oman's Civil Status system described in detail later in section 5.3.1 was identified and announced as the best e-government application project

in the Arab world in an information society world summit held in Tunisia in 2005 (Times of Oman, [2005] and Alwatan [2005]).

In the area of B2B, Oman Tradanet is a leading company that offers e-commerce solutions to both public and private organisations. There are more than 100 companies, including leaders in their fields, registered to use the e-commerce elements of e-document procurement, tender, auction, logistics, and marketing systems through online catalogues (OTN, 2005).

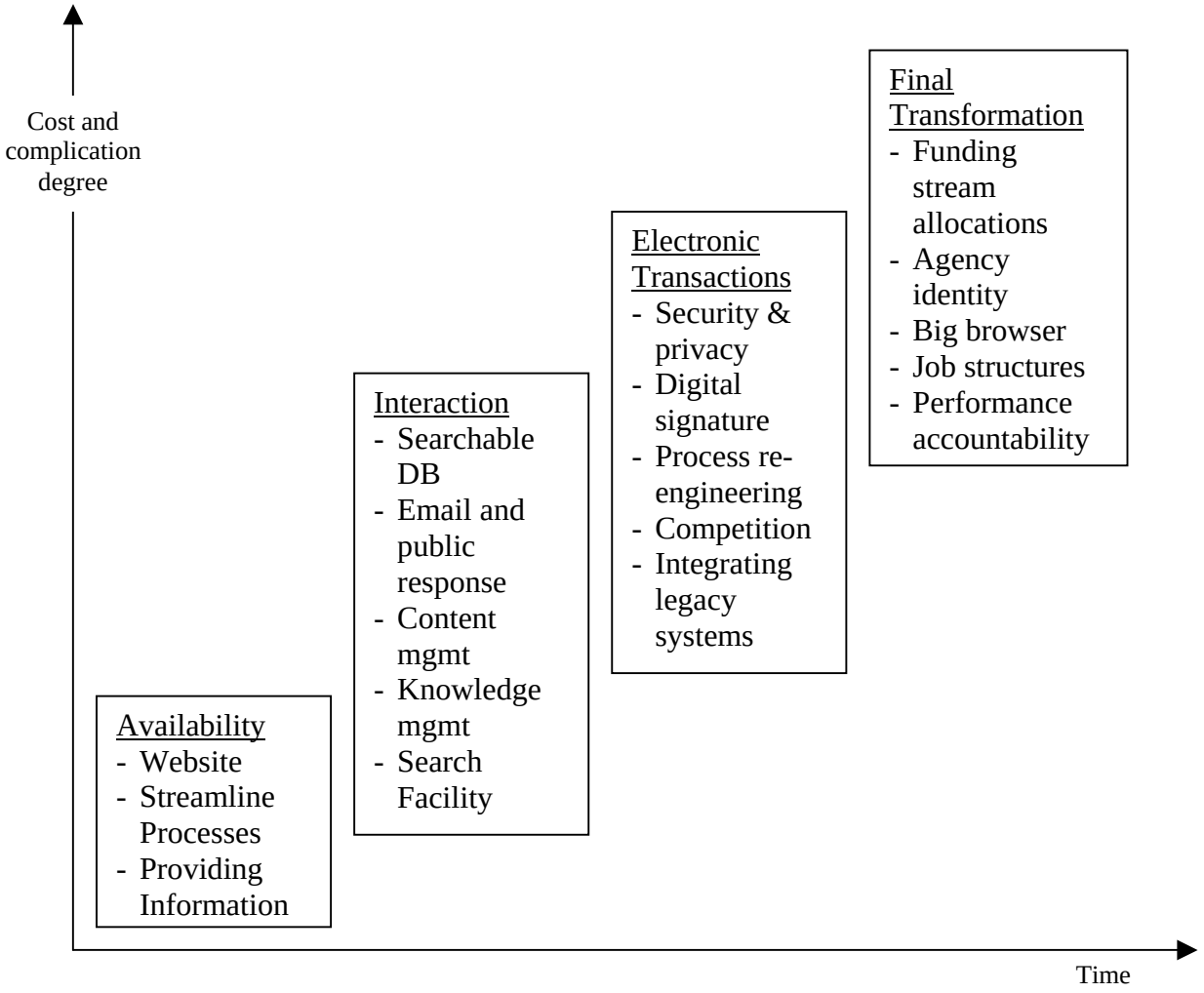
5.3 E-Government in Oman

ESCWA (2003) assessed the use of ICT applications in government organisations according to the following criteria: computerisation of public agencies, digitisation of information, e-government planning usage, and finally e-procurement. Oman was ranked at maturity level 2), indicating strategies have been set but there was at that stage incomplete planning/implementation underpinning this strategy. The study found e-government organisations in Oman lacked interactivity and mainly delivered information.

Rajha Abdulamir Ali, former Undersecretary of Ministry of National Economy and now the Minister of Tourism in Oman, declared that e-government development in Oman would advance in four stages (Ali, 2003) as follows and depicted in Figure 5-8 *(These steps also match many other e-government systems' development stages in advanced nations, see for example Drüke [2005])*:

- availability: building websites, providing information and data for users
- interaction: utilising communication channels such as email and interactive websites for interaction with Omani and external users

- electronic transactions: this is a complex stage and includes flexibility for transactions, payments and fees
- final transformation: final stage where working electronically becomes the norm throughout the sultanate.



Source: Ali (2003)

Figure 5-7: Four stages of e-government development in Oman

She (Ali, 2003) further reported that Oman was then developing specific projects to launch the e-government strategy as described earlier in section 5.2.2, such as:

- Oman e-government portal website
- government tenders website
- government suppliers website
- national statistics website, and government forms website.

5.3.1 E-government Initiatives

Government organisations exhibit considerable variation in their commitment to implement e-government. Whilst a number of organisations have embraced the concept, others do not see e-government as a priority. The following paragraphs describe Oman's e-government initiatives in detail.

The Royal Oman Police (ROP) (www.rop.gov.om) is committed to implementing e-government. Users of its website can check for Driving Violations and Visa Status online using details of their ID and driving licenses. In January 2004, the Directorate General of Civil Status part of ROP introduced a new civil status system (Civil Register) to collect personal information on births and deaths, marriages and divorces (Oman, 2004). The system is supported by a multifunction ID smart card with an embedded electronic chip that features biometric recognition. The card is intended to provide instant access to the holder's civil status details and greatly improves the government's administrative processes. The ID is planned to be used for financial and personal transactions with government, and specified transactions with the private sector. The smart card's use may be extended to other Ministries such as a medical card for the Ministry of Health or an employment card for the Ministry of Manpower. Gemplus, a leading company in smart card solutions (Oman, 2004) was selected to undertake the smart card project late in 2002. The contract called for the initial issue of over 1.5 million smart cards to Omanis and non-Omanis and included system renewal and update capabilities.

This system which issues ID cards for Omanis and Labour cards for non-Omanis has many advantages (Oman, 2004) as follows:

- the card protects the identity and rights of people in regards to inheritance and relationship matters

- it assists individuals registering their life changes, that is, civil status
- it facilitates the issue of life change/civil status certificates for Omanis
- it improves services, and reduces process time for transactions.

The quoted source acknowledged government benefits as well:

- the system avoids the redundancy of different government organisations collecting the same information
- it builds a national citizens database to readily provide demographic indicators and statistical information
- it links to other systems to enhance the efficiency and effectiveness of government services to the public.

The government source also lists the features of the new smart card as follows:

- storage and processing capability
- protects information through biometric recognition systems
- includes a driving licence for Omanis in addition to a labour card for non Omanis
- acts as a multi-purpose card that can be used at borders when traveling and as a credit facility
- contains public key infrastructure (PKI) capabilities for secure e-commerce transactions
- can be used in future to finish government transactions either by providing a direct link to the holder's civil status record and / or for payment purposes, when full integration to the system is established.

Currently ROP stores the following information inside each card (Oman, 2004):

- name and civil number for holder
- driving licence information
- passport information

- fingerprints
- holder's address and phone numbers
- job and education level
- holder's photo
- visa information for non-Omanis
- sponsor information for non-Omanis.

ROP also offers online download for its application forms regarding licences, passports and visas (Directorate General of Civil Status, 2005).

In addition to the above initiatives, ROP utilises the Oman Arab Bank smart card system for payments of customs fees at Sultan Qaboos Port and Seeb International Airport (Alwatan, 2004a). Users who are customers of Oman Arab Bank can apply for a smart debit card at the bank and are charged as required from another of their accounts at the bank. The customs' fees application and the smart card are then submitted to the ROP employee at either Sultan Qaboos Port or Seeb International Airport, details entered and the transaction authorised by the user. The ROP collects these fees remotely, using a modem to return the funds to its Oman Arab Bank account. ROP staff were trained in the use of this system.

To facilitate the processing of new and renewed passports and visas, the ROP represented by the Directorate General of Passport and Residences Services approached the Ministry of Transport and Communication to use post offices as agencies for the physical receipt (initially) of relevant applications. The post offices can facilitate the collection of applications for the Directorate, which, for a nominal fee, will allow same day processing and an early return to the post office for collection of the passport or visa. As the pilot for this program is located in the Muscat area, the passport/visa can

then be returned next day. The post offices will extend working hours during the week and possibly open at weekends.

Muscat Municipality (www.mctmnet.gov.om) a leading organisation in e-government, has online information services for residents on such matters as building permits, rent contracts and municipality licences; clients can also pay online using the Mobile-Rial (M-rial); an e-currency for municipal services. Internet cafés and service bureaus are encouraged through financial incentives to participate in this e-currency initiative. The municipality is pursuing arrangements with local banks regarding electronic transfers of funds and plans to introduce e-payment through credit cards in the near future.

In addition, a leading mobile government (m-government) application has been introduced recently by the municipality in cooperation with Mobile Oman, one of the mobile operators in Oman. The system allows car owners to pay for parking fees in the Muscat area using their mobile phones (Alwatan, 2005a). Motorists now can send a SMS to a certain number with their car's registration number and the time needed. The fees will be calculated and added or deducted (prepaid users) to the motorist phone bill and he/she will be receive a confirmation SMS for the reservation, and moreover, motorists will receive a reminder SMS when time is about to expire with an option to pay for more time (Times of Oman, 2005a).

Ministry of Manpower (www.manpower.gov.om) has introduced a job bank employment system registering both job seekers and private sector vacancies. The Ministry uses e-government throughout Oman to facilitate job hunting. Job seekers and employers also have the ministry's website to place or access the information they require. The Ministry has also adopted a system to track all private sector employees'

performance and attendance. This system is connected to the Public Authority for Social Insurance to insure that safety and rights of employees are secure (Alrashdi, 2004).

In addition, regional e-services centers 'SANAD' were established by the ministry in cooperation with Bahwan CyberTek, a leading IT based local company, to create job opportunities on the area of IT Enabled Services for Omanis. The centers are owned by young Omanis with a percentage to the private company in which they would be using the ministry's labor card smart form system to offer expatriates a fast approach to renew and receive their labor cards. In addition, these offices are planned to interconnect with different government systems and e-services to enable single window delivery of services for e-services such as utility bills, internet, mobile, and municipality services.

The Ministry of Commerce and Industry (www.mocioman.gov.om) has initiated a one stop shop project for company registrations as part of the National IT strategy produced in May 2003. The process of registering a company usually requires input from different government parties - such as the Oman Chamber of Commerce and Industry, Muscat Municipality, the ROP, the Ministry of Commerce and Industry and the Ministry of Manpower. Registration of a company is complex, due to administrative imperatives and geographical separation although initially, representatives from the different registering bodies were co-located. To facilitate registration, the process required for each government organisation is being placed online, at a total cost of $US2.6 million. The project was awarded to GBM (IBM branch in the Gulf region) in May 2005 and is expected to finish a year later. In addition, the Ministry also has an agreement with Oman Arab Bank to accept payments through the bank's smart card system. The bank's customers can now make payment for the Ministry's services via their bank smart cards.

The Ministry of Justice (www.moj.gov.om) is another leading Ministry in Oman in adopting ICT applications to enhance its internal and external processes. The Ministry's IT initiatives are strengthened by its Information Systems Center, which is proving superior to many IT centres in other Ministries. The Information Systems Centre has created and maintains an intranet to link the Ministry's divisions and connect to the courts external to the organisation. The centre has upgraded the Ministry's website, providing users with information on Oman's legal system, legislation and regulations, jurisdiction of its courts, information regarding Omani legal representation, and administrative details such as frequently asked questions (FAQ) and contact details. The center has built a network with internet access for offices of the Supreme Court and is completing the Ministry's ICT infrastructure.

Ministry of Awqaf & Religious Affairs (www.mara.gov.om) has developed an informative and interactive website for citizens and religious leaders (*Imams)* throughout the country. Users can access many documents and publications pertaining to religious affairs and issues. They can contact Ministry officials for advice and inquiries related to religion matters through the internet and an electronic form. Imams can download Friday's speeches from the site, rather than report at the ministry premises physically, as before.

Directorate-General of Civil Aviation and Meteorology (www.met.gov.om) is a part of the Ministry of Transport and Communications. The Directorate provides daily map and text weather information for cities and regions in the sultanate. This includes access to satellite information and images and land and marine forecasts.

Oman Chamber of Commerce and Industry (www.chamberoman.com) is a good form of G2B applications where the chamber provides a secure electronic community where businesses can register, access and share information with other

private organisations. For a fee, businesses can register online and gain such services as the Chamber's pdf format publications, an entry in the Chamber's trade directory with hyperlink to the business' own website, access to industry and economic reports, join industry forums within the Chamber, access notification of current tenders in selected industries, and undertake online training programs.

Muscat Securities Market (www.msm.gov.om) provides an informative website detailing the security market's structure, its regulatory environment and the securities and other products on offer. The security market offers trading information on each security or index, including real time offers and trades. It also has provision for traders to register and receive email and SMS alerts about selected companies' security prices, news and activities.

The Central Bank of Oman (www.cbo-oman.org) initiated electronic funds transfers within the sector. This acted as a catalyst for the introduction of internet banking for Oman's major banks.

Ministry of Education (www.moe.gov.om) in Oman has contracted Cisco Systems to build a wireless local area network (WLAN), which, in the first phase, will connect 200 government schools (Alnabhani, 2005). This network will provide students with internet access and e-learning programs, particularly self-paced learning and access to lessons online. Implementation of this significant project was undertaken within five months, including three months for testing. The system is based on "Cisco Aironet 1200 Series Access Points and Linksys WMP546 Wireless PCI Network Cards, which offer 11 and 54Mbps connectivity and optimize secure encryption for improved security (AME Info, 2005)". The Ministry also offers secondary school students the option to access their semester results online through the Ministry website or to register online and receive the results on SMS. The site has information on its schools in the sultanate,

contact information for Ministry representatives and a downloadable news and information service.

Ministry of Civil Service (www.mocs.gov.om) introduced a central human resource database for all public sector employees in government organisations. The system holds employees' data on their recruitment, promotion, retirement and vacation entitlements. Later, it will be linked to the Ministry of Manpower job bank (described earlier) in order to broadcast public sector vacancies into the broader job market system.

Ministry of National Economy (www.moneoman.gov.om) has established an online information center for the country's economic and social indicators The Ministry maintains a comprehensive and timely service describing aspects of the government's short and long term development plans.

Oman Center for Traditional Music (www.octm-folk.gov.om) has a website with comprehensive information on Oman's traditional music, its instruments, songs and players. Its aim locally is to promote appreciation of traditional Arabic music and a wider musical environment; and the Centre has a wider objective to raise global awareness of the country's traditional music.

Ministry of Information (www.omanet.om) is Oman's portal to the world, with general information about Oman's environment - its history, economy, culture, tourist attractions, and political structure. It also provides links to Oman TV, AM and FM Radio with live over-the-internet broadcasts.

Oman News Agency (www.omannews.com) is a government organisation that provides up-to-date information and news about Oman and significant events around the world. Oman News also provides archival information and links to regional and world media organisations.

Port of Salalah (www.salalahport.com) provides users with valuable information about vessels' schedules, port tariffs and other port information and news. The Port promotes local and foreign investment to further develop its resources, with website information for traders and suppliers about Salalah Free Zone activities.

Oman Tender Board (www.tenderboard.gov.om) is the government tender portal on current opportunities for projects, goods and services, and information on its tendering regulations and practices. Further, it has listed registered companies that use the site for promotion purposes.

Ministry of Social Development (www.mosd.gov.om) has wide social responsibilities and the site provides copious information on the Ministry's divisions, especially children's affairs, social insurance and family matters. As part of e-government, this Ministry facilitates contact with Omanis through an online inquiry form and enquirers receive the answer via email.

Public Authority for Social Insurance (www.taminat.com) is an independent government agency that oversees and regulates social insurance policies for the private sector. It has comprehensive information on all aspects of social insurance and an interactive service for employers and employees. When registered with the Authority, employers can use the site for formal reporting purposes an example is notifying the Authority regarding the names of active, new and terminated employees. Employees on the other hand can notify the Authority of their current employment status or submit reports on claims. Employees can also use the interactive website to verify their superannuation contributions, suspend payments whilst abroad and recommence on return.

Public Establishment for Industrial Estates (www.peie.com) is a part of the Ministry of Commerce and Industry. This website has information about the

organisation's industrial sites throughout the country, promoting them for local and foreign investment. It has an online register to facilitate information flows for suppliers and contractors. Estate tenants have a private section where they can log on to view their factory details, invoices, payments and utilities accounts.

Other governmental institutions have built informative web sites that provide useful information and reports for users. They also contain useful directories for contacts and FAQs, and in some cases information pertaining to tenders and available job vacancies.

5.4 Summary

This chapter describes in detail the state of the ICT sector and e-government in Oman. The discussion shows that the country's ICT services and infrastructure is in an early stage of development. Despite this, the Oman government is undertaking a thorough planning and development program for the sector, a change in direction that is understandably taking longer than expected to implement. Any delay in the e-government program may cause it to lag behind development within the information and communication sector and global trends. Internet penetration is still low among the general population. The Muscat governorate is the most advanced in terms of basic ICT infrastructure, services and adoption rates. Other regions show limited ICT adoption and development.

Omani society is small and diverse in many aspects. The discussion showed that the group most likely to be early adopters of any electronic or internet-based system in Oman represents a small segment of the total population; about 23.7 per cent. This segment includes those who hold at least a secondary school certificate and educational

qualifications above this. Despite government efforts to provide an efficient educational system, illiteracy rates are high, at 22 per cent of the total Omani population.

The following chapter (Chapter six Oman Case Study: Surveys and Interviews) examines in depth the data from surveys and interviews undertaken by this researcher and elaborates upon and ascertains the validity of findings from chapter four and this chapter. Chapter four, Barriers and Lessons to the Uptake of E-government, draws insights on perceived barriers to e-government adoption in Oman, plus lessons extracted from advanced e-government experiences.

6.0 Oman Case Study: Surveys and Interviews

This is the second of three parts that together aim to gather, document and analyse information about the Oman case study. This chapter describes the quantitative and qualitative data analysis techniques used in the study as illustrated earlier in chapter three. It begins by defining the demography of participants who were selected as being the likely early adopters of e-government in Oman. Next, correlation tests are performed to uncover possible relationships between key variables and finally, an analysis of the barriers to the uptake of e-government in Oman and relationships to other key variables is introduced. Interview results were used to elaborate on and enhance the findings from the surveys.

6.1 Introduction

As described in chapter three, analysis methods were selected with the aim of answering the study's research questions. The central aims were to note the major barriers to the uptake of e-government in Oman and propose solutions. Detailed treatment of research questions and findings reached are presented in chapter eight in section 8.1. Surveys and interviews are the primary data collection methods used. Surveys were distributed to different segments of Omani society to draw a profile of those people who are more likely to use e-government in Oman, and discover possible barriers to its adoption and dissemination. Interviews were conducted to review plans, progress and barriers faced in the development of e-government in Oman from the decision makers' point of view. Findings from these interviews were used to extend and give further details on the survey outcomes.

Accordingly, and bearing in mind the central research questions and aims, this chapter is organised as follows:

- Section 6.2 uses information from surveys and interviews to describe the key characteristics of participants and draw a profile of those people more and less likely to use e-government services in Oman.
- Section 6.3 examines the surveys for possible relationships between key variables with the aim of defining the vital factors for e-government adoption and their impacts, and interview results are used to affirm and/or elaborate on these findings.
- Section 6.4 examines the perceived barriers to the adoption and diffusion of e-government in Oman. It uses survey results and data gathered from interviews to define vital obstacles, their causes and consequences.

6.2 Demography of Participants

This section uses basic frequency distribution techniques to describe the characteristics of survey participants. As mentioned in chapter three, the sample was chosen to represent those people most likely to be the targeted users of e-government in Oman. Hence, the ultimate aim of this analysis is to isolate the defining characteristics of these people using information gathered from surveys and interviews.

6.2.1 Demography: Surveys

Surveys were distributed to 140 participants representing different segments of Omani society as illustrated in chapter three, section 3.3.2.1. The main criteria used to select the sample were education and income, to ensure people have the necessary computer skills and financial means to use e-government. Accordingly, only people fitting one or both criteria were chosen for the study. The segments chosen were: secondary school students, final year undergraduate students, university academics, and

public and private sector employees. Here, the study starts by defining each segment individually and later a general view of the survey population is presented (detailed frequency distribution tables are listed in Appendix C).

Secondary School Students (total of 40 participants): This category didn't differ as expected in terms of the three main characteristics: age, income and education. All were less than 20 years old (with the exception of only one participant); they were not working and therefore their income was less than OMR200 a month; and all were about to complete their secondary school certificate. In terms of their computer experience, 65 per cent (26 out of 40) were seen to be computer literate. The majority (85 per cent) reported using computers at home; 57.9 per cent of this category were spending one to three hours on computers daily and only 36.8 per cent were using computers mainly for internet applications.

Regarding internet experience, 43 per cent (17 out of 40) were found to be internet literate, 92.5 per cent had used the internet before, 50 per cent reported spending one to three hours using the internet daily, 62.2 per cent used the internet mainly at home, 42.7 per cent spent OMR5-10 monthly on internet access, and the majority reported e-mail, information and knowledge search as their main uses of the internet.

As to e-commerce experience, only 33 per cent (13 out of 40) were e-commerce literate and 62.5 per cent were willing to do e-commerce. The main activities performed by e-commerce literates in this category were searching and requesting information about services and products. When asked if they had ever shopped on the internet, 15 per cent reported yes. In terms of their perceptions about public services, 82.5 per cent (33 out of 40) were required to perform transactions with public organisations in the near future, half of the secondary school students made less than 5 transactions with

government annually, and about 70 per cent of them conducted these transactions face to face.

In terms of e-government experience, 31 of the 40 participants (77.5 per cent) had never heard about the e-government concept before completing the surveys, 95 per cent thought e-government would be helpful to Oman, and 92.5 per cent were willing to use it. Moreover, 33 out of the 40 (82.5 per cent) were not aware of any e-government initiative in Oman. When asked to rank different barriers according to their relevance to the Oman situation, users' lack of IT knowledge, awareness and motivation was ranked the highest.

It should be emphasised here that the surveys were distributed to this segment of the sample before the government began introducing computer labs and courses in government schools (i.e. students' IT experiences were not a result of school education).

Undergraduate Students (total of 40 participants): This segment also shared almost the same basic characteristics as the previous group: 37 of the total 40 participants in this category (92.5 per cent) were between 20 and 30 years old, none was working and all were about to complete their bachelor degrees. In terms of computer experience, 72.5 per cent (29 out of 40) were found to be computer literate. Despite this, all of them indicated that they had used computers before. Home and internet cafés were the primary places where most of the undergraduate students used computers, and 62.5 per cent reported spending one to three hours daily on computers, with internet and office applications as their main uses of computers.

On the subject of internet experience, despite the fact that all participants in this category reported having used the internet before, only 22 out of the 40 (55 per cent) were found to be internet literate. The majority (62.5 per cent) of them indicated spending between one and three hours daily on the internet, and home and school were

the main locations for using the internet. A greater part (77.1 per cent) stated spending less than OMR10 per month on internet access, with email and searching for information being the main reasons to use the internet.

Regarding e-commerce experience, only 42.5 per cent (17 out of 40) were found to be e-commerce literate, all of whom reported shopping on the internet. A smaller percentage of this e-commerce literate group used the internet to find information about services and products (60 per cent), and 42.4 per cent requested further information about services and products online. On the other hand, 62.5 per cent were willing to make e-commerce transactions. More than two-thirds (72.5 per cent) of the participants in this category indicated their intention of conducting transactions with government organisations in the near future, 60 per cent of them were currently using a face-to-face approach, and half of them (50 per cent) reported performing less than five public transactions annually.

In terms of e-government experience, 28 participants out of 40 (70 per cent) indicated familiarity with the e-government concept before completing the survey, but only 32.5 per cent of the total participants were aware of e-government initiatives in Oman. The greater part of this segment (90 per cent) thought that e-government would be helpful to Oman and expressed willingness to use it. The participants in this segment reported that the main barrier to e-government adoption in Oman is lack of marketing campaigns.

Academics (total of 20 participants): More than half of the surveyed academics (55 per cent) were between 31 and 40 years old, 65 per cent (13 out of 20) earned a monthly income of more than OMR900, and all of them held post-bachelor degrees. In terms of computer experiences, all 20 participants were found to be computer literate and they were using computers mainly at home and work. The

majority (70 per cent) used computers between four and ten hours daily, and internet and office applications were the primary uses for computers within this group.

Regarding internet experience, although this entire group reported using the internet, only 16 of the 20 participants (80 per cent) were found to be internet literate. Most of the academics used the internet more than one hour a day, mainly at work. This fact might explain why about half of them (52.9 per cent) were found to be spending less than OMR5 monthly on internet access. Email, information and knowledge search were the main reasons for academics using the internet.

As to e-commerce experience, 80 per cent of the academics were found to be e-commerce literate with 70 per cent reporting shopping on the internet; all of them indicating using the internet to find and request information about services and products. When it came to e-payment, 60 per cent (12 out of 20) stated they had paid for products or services on the internet but only 30 per cent (6 out of 20) paid utilities bills using an electronic medium like the internet. On the other hand, when asked if they would be required to perform transactions with the government soon, 19 out of 20 (95 per cent) said yes with more than half (60 per cent) reporting they usually did less than 10 transactions annually with the government. Sixty-five per cent reported conducting transactions with the government face to face.

In terms of e-government experience, almost all of the academics (19 out of 20) stated they had heard of the e-government concept before completing the questionnaire, but only 55 per cent (11 out of 20) were aware of initiatives in Oman. Moreover, all of them indicated their intention to use e-government and that it would be helpful to Oman. When asked to rank barriers according to their relevance to Oman, academics chose lack of user trust and lack of marketing campaigns as having the highest relevance.

Public Sector Employees (total of 20 participants): More than half of the participants in this category (60 per cent) were between 20 and 30 years old and held bachelor degrees. Fifteen of the 20 participants (75 per cent) reported earning a monthly income between OMR500-900. In terms of computer experience, all participants were found to be computer literate and used computers mainly at work. They all used computers more than one hour a day with internet applications being the main reason.

Regarding internet experience, only 75 per cent (15 out of 20) were found to be internet literate despite the fact that all of them reported using the internet. The greater part of this category (70 per cent) used the internet less than three hours a day and used it primarily at work. Fifty per cent of participants spent no more than OMR10 a month on internet access with email, information and knowledge search as the main reasons for using the internet.

On the subject of e-commerce experience, 13 participants (65 per cent) were e-commerce literate, of whom 30 per cent reported shopping on the internet. However, about only 15 per cent indicated they had paid for products, services or utilities bills online. The majority (80 per cent) reported willingness to do e-commerce. On the other hand, only about half (55 per cent) of the participants answered yes when asked if they were required to do any transactions with the government and they chose face to face as the primary means of doing so.

As for e-government experience, the majority (19 out of 20) reported awareness of the e-government concept in general but only half of them (10 out of 20) were aware of any e-government initiatives in Oman. All except one participant stated that e-government would be helpful to Oman, and all of them were willing to use it. Unlike the other groups surveyed, government employees perceived poor infrastructure and technologies to be the main barriers to e-government in Oman.

Private Sector Employees (total of 20 participants): More than two-thirds of this category (70 per cent) fell in the 20-to-30-years-old range. All of them held higher education degrees with 70 per cent holding bachelor and 30 per cent post-bachelor degrees. Only 5 per cent of this category earned less than OMR500 per month and 50 per cent had a monthly income of more than OMR900. In terms of computer experience, 19 participants (95 per cent) were found to be computer literate and cited work as the main place where they used computers. Twelve participants out of 20 (60 per cent) used computers between four and ten hours a day with internet and office applications as their key uses of computers.

Regarding internet experience, almost all participants (95 per cent) used the internet but only 45 per cent (9 out of 20) were found to be internet literate. Less than half (45 per cent) spent less than one hour a day on the internet and 35 per cent spent between one and three hours a day. Work and home were reported as the primary places to use the internet in this category. Email, information and knowledge search were the key reasons behind their internet usage. Seventy per cent of participants in this group paid less than OMR10 a month for internet access.

As to e-commerce experience, only 9 participants (45 per cent) were found to be e-commerce literate. Despite this, half of the private sector employees reported shopping online and 35 per cent (7 out of 20) stated they had paid for products and services on the internet. As for their willingness to use e-commerce, 80 per cent of the participants were interested in conducting e-commerce activities. In addition, 85 per cent of the participants in this category planned to generate online transactions with the government in the near future, of whom 65 per cent perform less than 10 transactions a year, and about 95 per cent reported doing mainly face-to-face transactions.

In terms of e-government experience, 18 participants (90 per cent) had heard about the e-government concept but only 10 (50 per cent) were aware of e-government initiatives in Oman. All of them thought this would be helpful to Oman and 19 of the 20 participants (95 per cent) showed interest in using e-government in Oman. Users' lack of IT knowledge, awareness and motivation was seen as the main inhibitor to e-government improvement in Oman.

General Profile of all Survey Participants (total of 140 participants): About half of the survey participants (49.3 per cent) fell in the range of 20 to 30 years old, 47.1 per cent held bachelor degrees, and 56.4 per cent had a monthly income of less than OMR200. There were more participants with a monthly income of less than OMR200 simply because both secondary and university students (a total of 80 participants out of 140) were included; when these students are discounted, 50 per cent of participants' monthly incomes fall between OMR500 and OMR900. Figures 6-1, 6-2 and 6-3 illustrate the distribution of all participants against key variables: age, education, and income respectively.

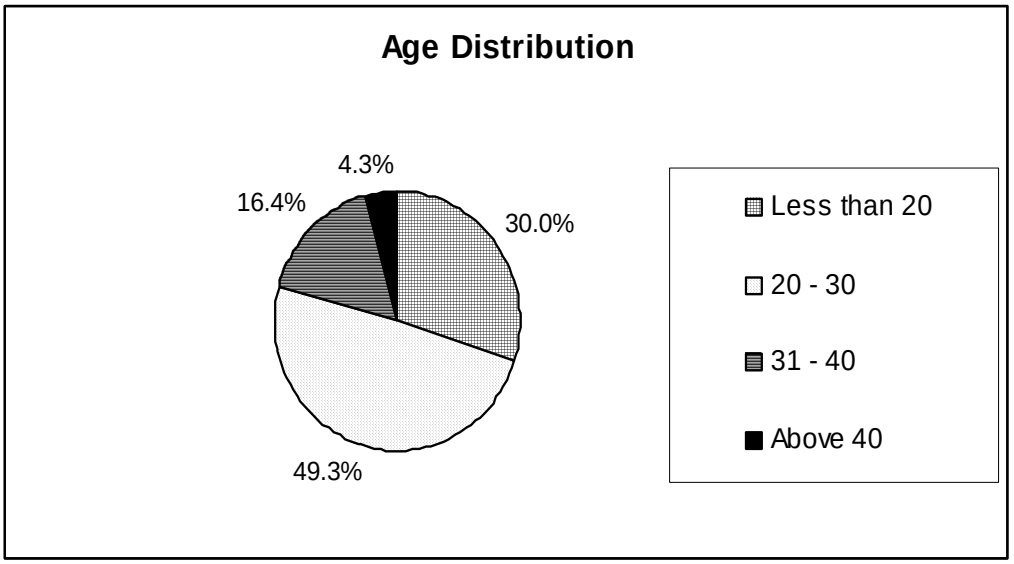


Figure 6-1: Survey participants: distribution according to age range

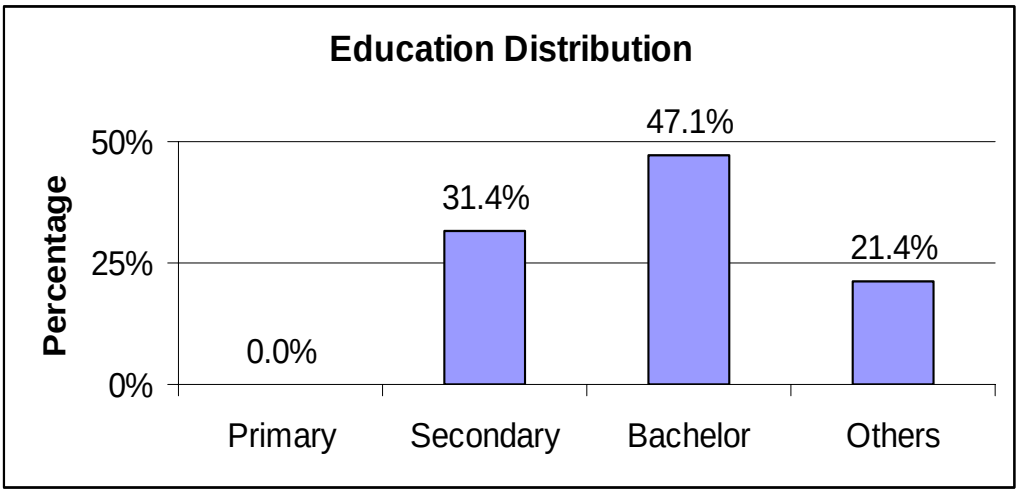


Figure 6-2: Survey participants: distribution according to education level

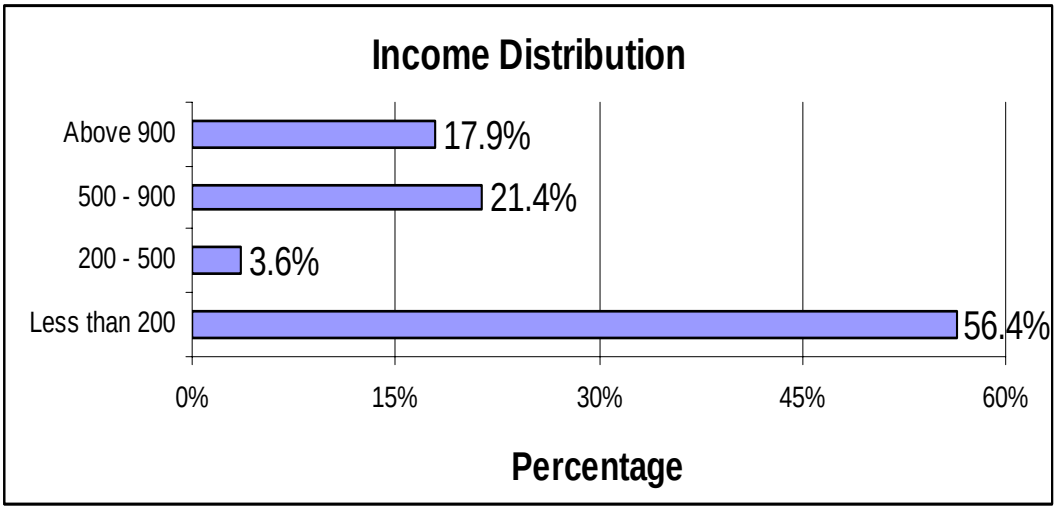


Figure 6-3: Survey participants: distribution according to income level

Table 6-1: Frequency distribution of participants against key variables

	Computer Literate	Internet Literate	E-commerce Literate	Willingness to do e-commerce	Willingness to do e-government	Awareness of e-government in Oman	Awareness of e-government Concept
Yes	114	79	68	102	132	51	93
%	(81.4%)	(56.4%)	(48.6%)	(85.7%)	(94.3%)	(36.4%)	(66.4%)
No	26	61	72	17	8	89	47
%	(18.6%)	(43.6%)	(51.4%)	(14.3%)	(5.7%)	(63.6%)	(33.6%)
Total Out of 140	140	140	140	119	140	140	140

Table 6-1 shows the distribution of participants against key dependent variables. The computer literacy rate among participants was found to be reasonable at 81.43 per cent, but rates tend to decrease when we move from computer literacy to internet and e-commerce literacy at 56.43 per cent and 48.57 per cent respectively.

Home and work were the primary places where participants used either computers or the internet, and about half of them (47.9 per cent) spent between one and three hours daily on computers or the internet. The main uses for computers and the internet among participants were found to be e-mail, office applications and searching for information and knowledge. In addition, a small portion of the participants (about one-fourth) reported using computers and the internet for chatting, games and entertainment. When it came to participants' adoption of e-commerce activities, only a small portion (25.7 per cent) reported shopping online, 17.1 per cent stated that they had paid for products or services on the internet, and only 9.3 per cent reported paying utilities bills through electronic means.

On the other hand, the majority (79.6 per cent) of participants indicated that they would be required to do transactions with the government in the near future. When asked about the number of times per year they usually had transactions with the government, 59.4 per cent answered less than five times and 22.7 per cent replied between five and ten times. The frequency of annual government transactions is an important factor that has been analysed further in section 6.3.1 against people's willingness to use e-government. In addition, the means of interaction with the government was reported by 69.7 per cent of the participants to be face to face. The rest indicated that they might sometimes use an agent or the phone instead of face-to-face means.

The average relevance scores (top five) of the barriers to e-government in Oman, as ranked by the survey participants, is as follows (please refer to Appendix C for full relevance scores of all barriers):

- Barrier 1: Users' lack of IT knowledge, awareness and motivation
- Barrier 13: Lack of marketing campaigns
- Barrier 12: Lack of proper legislation and laws
- Barrier 7: Poor infrastructure and technologies
- Barrier 4: Users' lack of trust and confidence.

In general, all barriers averaged a score above 3 which indicates a relevance to Oman with varying degrees of importance.

6.2.2 Demography: Interviews

As described in chapter three, section 3.3.2.1, thirteen interviews were conducted with key officials from public and private organisations in Oman. Please refer to Appendix D for full indexing of interviews. Here, the interview results are used to elaborate upon the above findings from the surveys about the demography of participants.

Starting with background information, surveys revealed that the majority of participants were in the 20-to-30-years-old category. Many interviewees stated that young people like this have more potential to learn and adopt IT-based applications than older people and that Omanis in general are open to change. A high official from the Ministry of Finance stated that, "Omanis are highly adaptable to change and accept changes quickly". Another official from the Ministry of Civil Service claimed that, "30-year-old people and above don't know how to use computers in general and we should not expect much out of them in relation to using e-government".

The latter point is important also in suggesting that older generations have lower rates of IT literacy than younger ones. For example, a government official stated:

> *During the ceremony of launching our website lately, one of the attended ministers said "We're illiterate". This made me to realise that he admired new technologies and was ready to change. It also draws some general conclusions about our senior management ICT knowledge and that they need to be made informed and aware about the potentials of ICT.*

Interviews revealed also that the digital divide is not unique among less educated people but could be obvious among highly educated people depending on how much they use computers and technology in their daily work. These facts are confirmed in section 6.3.

Another issue that has an impact on people's IT literacy is OmanTel's current services as cited by many interviewees. OmanTel's current high-cost hourly internet access scheme was seen to have forced many citizens to seek less expensive options for using the internet. These options include using the internet at their work, school, or at home (in the case of school children) where they can get it usually for free. Internet cafés are another economical option for using the internet where users pay only for the time they spend online with no monthly subscription fees. As indicated earlier, surveys revealed that the majority of participants were working and using the internet mainly at work and at home.

Survey results indicated that people's awareness about e-government initiatives and plans is low. Interviews revealed the main reason for this is a lack of marketing campaigns. This was also found to be a major barrier to e-government adoption in the survey results. Some government organisations believe that they only have to advertise

their online services once, when they first launch the service, and after that it is up to the users. For example, an official from Royal Oman Police stated that,

> *We've provided the services online and announced it publicly. Our responsibility ends here. The users have to decide themselves on how to use it and we don't want to be involved in this. It's totally up to the users., The services are online and we still have the other physical channels available in case they decide not to use the online ones.*

On the other hand, interviews revealed many other barriers to e-government in Oman which are discussed in more detail in section 6.4. In general, the ranking by survey participants of barriers relevant to the Oman situation was found to parallel those rankings produced from the interviews.

6.2.3 Demography: Summary

This section aimed to define the characteristics of survey participants who were thought to be the most likely early adopters of e-government in Oman. Figure 6-4 depicts the major findings from this section based upon an overall view of the total 140 participants.

The level of IT literacy was found to be low in general. Awareness about the government's plans and achievements in the ICT sector in general and e-government in particular were found to be low. The reasons for this were seen to be mostly non-technical, as were the barriers to e-government adoption and diffusion in Oman. Infrastructure issues were acknowledged but were not seen as being of high relevance or impact when compared with non-technical factors such as user IT awareness and knowledge.

Bearing in mind that the sample was selected to represent the likely early adopters and targets of e-government services in Oman, the IT literacy rates are not

promising especially for the short term. It was found also that participants' awareness and knowledge of either the e-government concept in general or e-government initiatives in Oman are low, at 66.4 per cent and 36.4 per cent respectively. Despite this, it was found that when participants were briefed about the e-government concept and benefits through the survey, their willingness to use either e-commerce or e-government services showed good potential at 76.1 per cent and 95.71 per cent respectively, while 133 participants out of 140 (95 per cent) indicated that e-government would be very helpful to Oman.

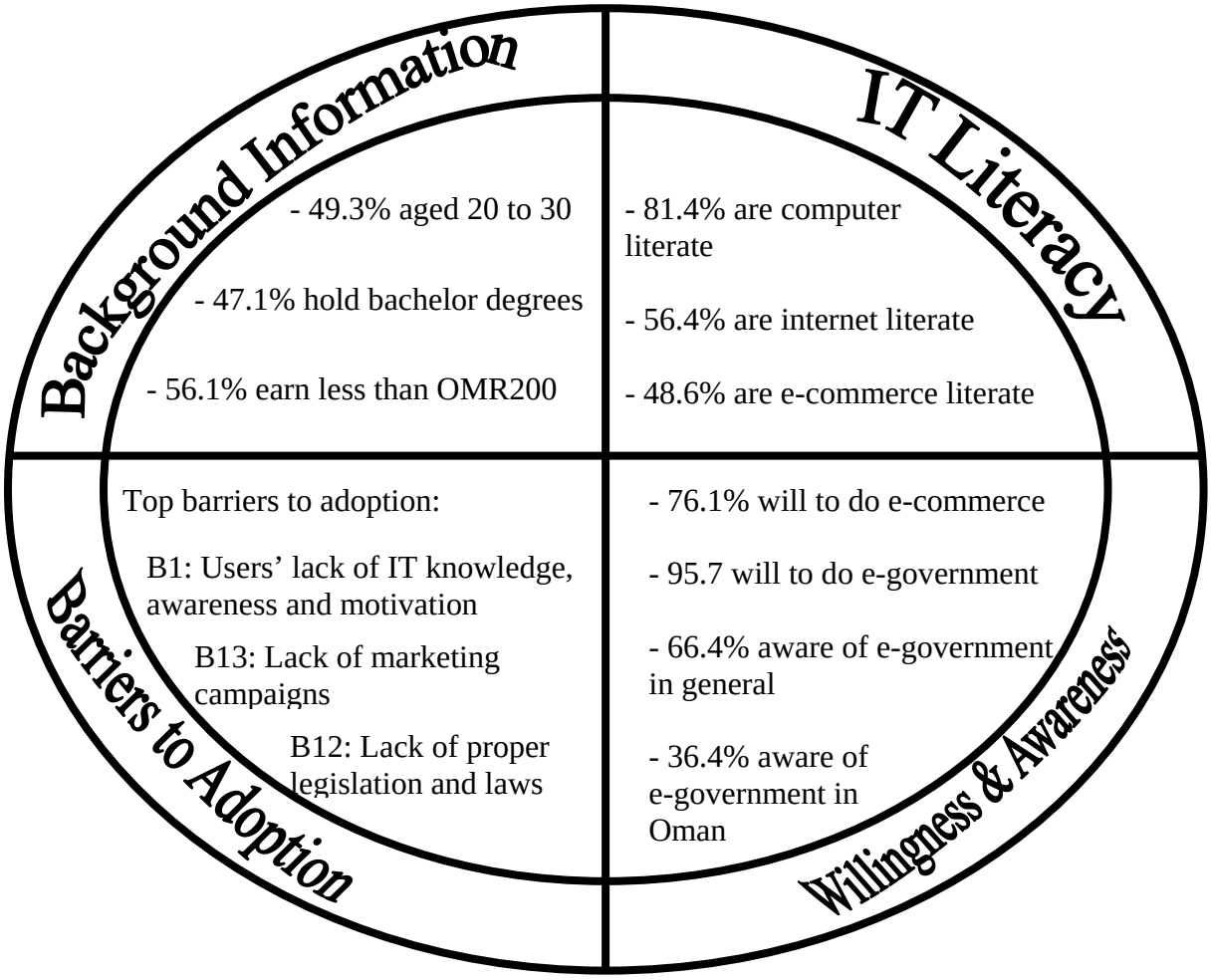


Figure 6-4: Demography of participants

The main aim of the next section is to define key variables and the relationships between them in order to identify the reasons behind these initial findings. Surveys and

interviews revealed that age, education and income are important factors heavily affecting users' knowledge, capability and willingness to use e-government in Oman. The next section explores possible relationships between these key independent factors and other key dependent variables such as willingness to use e-government and awareness of e-government initiatives in Oman.

6.3 Exploring Relationships

Further analysis on surveys and interviews has been performed to draw additional conclusions about the characteristics of those people most and least likely to use e-government services in Oman. Grouped frequency distribution and correlation techniques are used to identify possible relationships between variables and to define key characteristics of the participants. Subsequently interviews have been analysed qualitatively to complement and elaborate upon the results reached through these methods.

6.3.1 Relationships: Surveys

The previous section presented basic trends and characteristics of the sample population. Here, further frequency distributions and correlation tests are performed to conclude vital factors and relationships. Table 6-2 defines the key variables that have been examined with the aim of addressing the study's aims and research questions. It also presents the different correlations implemented between base and dependent variables. These variables have been examined for possible relationships and causalities.

The number of participants falling into different classes or ranges of key variables varies significantly. For example and as illustrated in the previous section, there are more participants within the age range 20 to 30, with secondary education level, and less than OMR200 monthly income. Percentages are calculated (i.e. relative

frequency distributions) rather than using the actual number of frequencies to overcome possible bias that might be caused by having unequal numbers of participants in the different categories of variables. The percentages were calculated by dividing the total hits of the dependent variable category by the total frequency of participants in the corresponding independent variable. For example when comparing age ranges to computer literacy scores, the total number of participants falling in the age range 20 to 30 was 71; of these, 59 were found to be computer literate. The percentage in this case is 59/71 = 83.09 per cent, which means that about 83 per cent of the participants between ages 20 and 30 were computer literate.

Table 6-2: Independent and dependent variables of the study

Base Variable	Dependent Variable
- Age - Income - Education	- PC literacy (composite) - Internet literacy (composite) - E-commerce literacy (composite - Awareness of e-government in Oman (binary) - Awareness of e-government in General (binary) - Willingness to do e-commerce (binary) - Willingness to use e-government (binary)
- IT literacy (PC, internet and e-commerce)	- Awareness of e-government in Oman - Awareness of e-government in general - Willingness to do e-commerce - Willingness to use e-government
- Frequency of government transactions per annum - Awareness of e-government in Oman - Awareness of e-government in general - Willingness to do e-commerce	- Willingness to use e-government

As an example of the analysis performed according to Table 6-2 above, Figures 6-5 and 6-6 illustrate IT literacy rates and other key dependent variables against different age ranges respectively. In this instance, Figure 6-5 shows a positive trend between IT literacy and ages less than 20, to 40. A smooth decline follows with older

participants (40 and older). Figure 6-6 on the other hand shows that participants' willingness to use e-government and e-commerce applications is high across all age ranges, but that their awareness about e-government initiatives in Oman is low. Despite this and with the exception of participants less than 20 years old, people's awareness about the e-government concept in general is found to be good, as depicted by Figure 6-6.

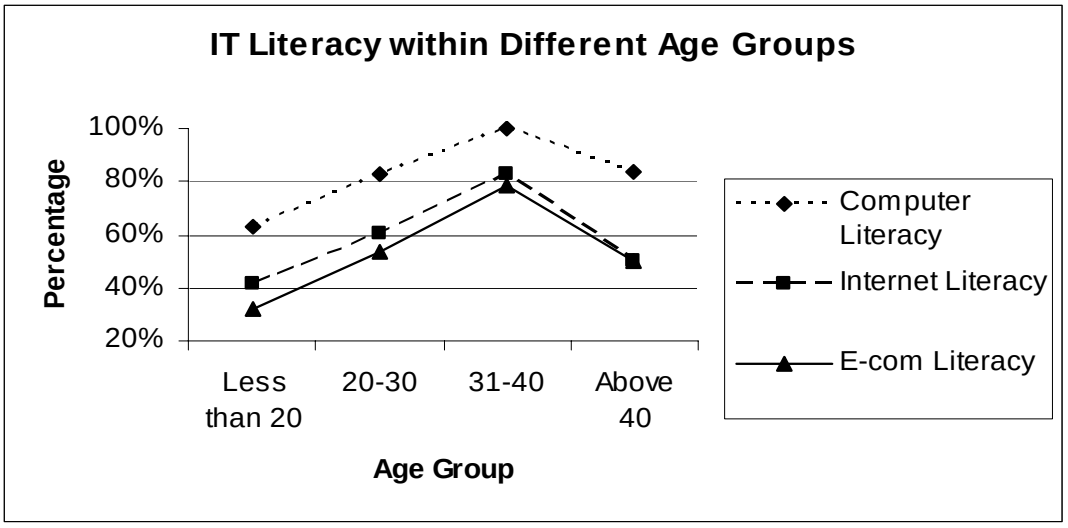


Figure 6-5: IT literacy of participants within different age ranges

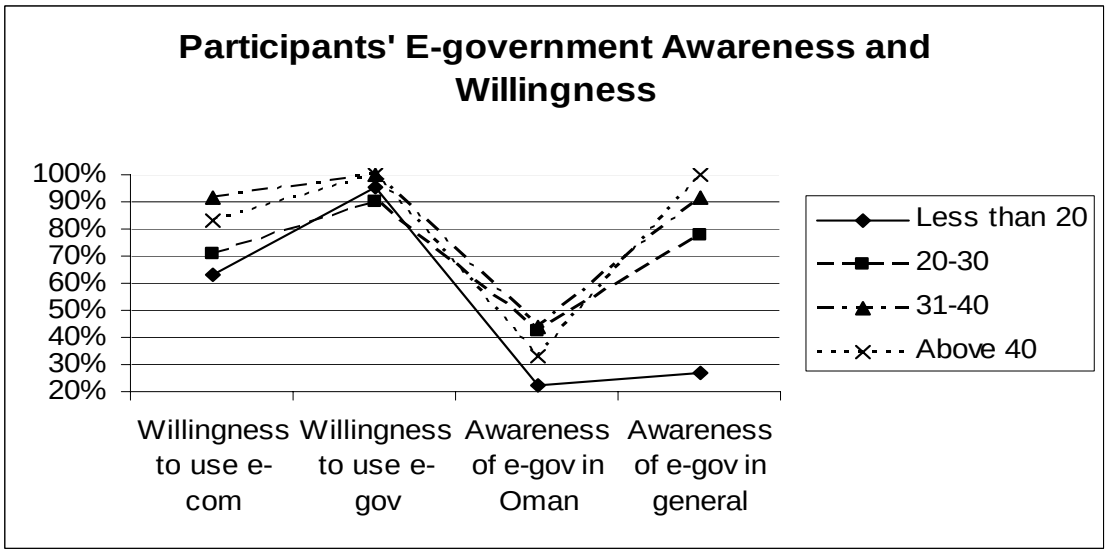


Figure 6-6: Relationships between age and key dependent variables

Table 6-3 shows the results of a correlation test performed between age as an independent variable and other key dependent variables. It can be seen that age and all

other variables correlate positively with each other with varying degrees. The down slope witnessed above with participants older than 40 years old negatively affected the correlation coefficients produced in Table 6-3. When performing the same test and excluding the last age class (above 40), the results improved to show stronger positive relationships as shown in Table 6-4.

Table 6-3: Correlation results for all age classes and key dependent variables

	Age	*Computer Literacy*	*Internet Literacy*	*E-com Literacy*	Willingness to use e-com	Willingness to use e-gov	Awareness of e-gov in Oman	Awareness of e-gov in general
Age	1							
Computer Literacy	0.661	1						
Internet Literacy	0.346	0.929	1					
E-com Literacy	0.537	0.985	0.977	1				
Willingness to use e-com	0.829	0.907	0.760	0.871	1			
Willingness to use e-gov	0.671	0.409	0.259	0.385	0.748	1		
Awareness of e-gov in Oman	0.459	0.896	0.858	0.875	0.640	-0.029	1	
Awareness of e-gov in general	0.921	0.835	0.577	0.726	0.836	0.420	0.761	1

Tables 6-3 and 6-4 also show significant relationships between other key variables. For example, computer literacy is positively related with internet literacy with a correlation coefficient above 0.9. This might be obvious as computer literacy is a vital prerequisite for internet literacy. Other findings are:

- IT literacy (i.e. computer, internet and e-commerce literacy) correlates positively with willingness to use e-commerce and e-government, and users' awareness about e-government both in Oman and in general.
- Willingness to use e-commerce is positively related to willingness to use e-government and users' awareness about e-government both in Oman and in general.

- Awareness of e-government in Oman shows a positive relationship with awareness of e-government in general.

Table 6-4: Correlation results for age (excluding the over-40 class) and key dependent variables

	Age	*Computer Literacy*	*Internet Literacy*	*E-com Literacy*	Willingness to use e-com	Willingness to use e-gov	Awareness of e-gov in Oman	Awareness of e-gov in general
Age	1							
Computer Literacy	0.999	1						
Internet Literacy	0.999	0.996	1					
E-com Literacy	0.999	0.997	1.000	1				
Willingness to use e-com	0.961	0.948	0.972	0.971	1			
Willingness to use e-gov	0.495	0.456	0.530	0.526	0.715	1		
Awareness of e-gov in Oman	0.890	0.909	0.871	0.873	0.730	0.045	1	
Awareness of e-gov in general	0.950	0.963	0.936	0.938	0.826	0.198	0.988	1

The same frequency distribution and correlation tests described above were performed on other base variables (education and income) according to Table 6-2 (refer to Appendix C for detailed correlation tables). The following key findings were reached:

- Education and income correlate positively with all dependent variables such as IT literacy and willingness to use e-government.
- IT literacy correlates strongly with willingness to use e-government and e-commerce.
- Users' awareness about e-government in Oman correlates positively with willingness to use e-government.

- The number of times annually a person is conducting business with the government (frequency of annual government transactions) is positively related to his/her willingness to use e-government. This indicates that the more times a person needs to transact with government, the higher is his/her willingness to use e-government.

In summary, all relationships explored as shown in Table 6-2, showed positive correlations with varying degrees of strength. Further correlation tests are employed between key variables and barriers to e-government adoption in section 6.4.

6.3.2 Relationships: Interviews

In general, the previous analysis tackled three main issues: IT literacy, e-government awareness, and e-government willingness. Interview results are employed here to provide more insights into each of these factors.

IT Literacy: Surveys revealed that IT literacy among people targeted for e-government in Oman coincides with their willingness to use e-government. This stresses the importance of enhancing the society's e-readiness and IT knowledge. The interviewees placed great importance on promoting and enhancing people's e-readiness in Oman. People's e-readiness involves educating young generations, training older ones, and spreading the word about the benefits of IT and e-government within the society. An official from the Ministry of Civil Service stated, "I have great faith in the coming generations as they are becoming more and more familiar to using the computers; they'll resist physical queues and will opt for online business". The same person, who happens to be running the IT department in the corresponding ministry, claimed that older people are least likely to adopt any e-initiative in Oman as they simply lack the needed skills and knowledge. On the other hand, a senior official from the Ministry of Commerce and Industry claimed that the digital divide is not as bad as it may seem; he asserted, "…there will always be a digital divide, people not willing or

not capable of performing online transactions. Digital divide in a sense is not a problem if we know how to live with it."

Interviewees identified many inhibitors to IT literacy in Oman. A highly-ranked official from the Ministry of National Economy claimed that e-government has both technical and non-technical issues that need to be tackled. Users must be able to use electronic means in terms of IT awareness, knowledge, and cost. Internet and PC charges were seen as crucial to IT adoption and they may hinder some people from using online services simply because it will be an expensive option for them. It was found that this issue could be resolved easily with proper planning. For example, a senior official from the private sector saw that internet cafés and service bureaus could act as a reasonable substitute for personal computers but they should be flexible in their operating times, services, locations and proximity to potential users. In addition, he suggested that ministries could also provide, share, or install in their premises public PCs that could be used to perform online activities with the ministry itself.

Centralisation is another issue that affects IT literacy and adoption in Oman. An official from Petroleum Development Oman (PDO) explained that government ministries usually have a few people who do most of the technical work for the whole organisation. In addition, he added that, "…government ministries in general have different work layers and hierarchy that affect computers' adoption. Many key staff have one or more secretaries who would do the computer stuff on their behalf and therefore eliminate their need to learn about computers or internet." He saw that it will only be more effective when computers are involved in everyone's work within the organisation hierarchy. Another official from the private sector spotted a key issue about barriers to IT literacy among key decision makers in Oman. He explained that many IT initiatives have few clear short-term benefits and this might negatively

influence decision makers' attitudes about IT, especially if they have little or no IT knowledge and are seeking fast results.

Cultural factors might sometimes be apparent also in this regard. An official from PDO responsible for the maintenance of the SAP (Systems Applications and Products) system indicated that at the time of introducing SAP to employees in the company:

> *The main difficulties began with people with low computer background who were used to do all their jobs manually. People with better knowledge about computers also resisted using the system at first, mainly because they felt that they don't have the freedom they used to have with the previous manual system. Now with SAP, all transactions could be tracked down and monitored by almost everyone in the company as opposed to the old manual system where employees used to place a procurement order at any amount. They mainly fear accountability and have not yet absorbed the transparency feature of the system.*

E-government Awareness and Knowledge: Surveys showed that people have a low awareness about the e-government concept and initiatives in Oman, which is a negative influence on their willingness to use e-government. This stresses the importance of spreading the word and increasing the society's understanding of e-government plans and benefits in Oman. Many officials from the public and private sectors agreed that marketing and offering incentives and promotions should be carried out along with the launch of online services to improve user acceptance. The head of e-commerce division in Oman TradaNet stated that, "…e-government plans and efforts are very much under-marketed. I'm in this field and still have not heard about e-

government in Oman." Other officials from the private sector stated that the majority of people in Oman lack proper awareness, guidance and in some cases they lack interest. They know how to perform simple internet activities pertaining to discussion forums, chatting and browsing through illegal sites but they don't know how to access the few e-government initiatives in Oman like downloading application forms.

Awareness about e-government and IT in general was seen to be varied between government organisations themselves. Some government entities are more active than others in terms of IT adoption. The head of the Technical Secretary Office in the Ministry of National Economy explained that this is due to how e-aware and IT-driven the leadership is in those ministries. He added that some simply don't trust IT and that it is the role of the Technical Secretary Office to promote and encourage others to be more IT-oriented and IT-aware. In addition, he explained that the Secretary aims to mitigate the digital divide between ministries and the different regions in the sultanate, and that there is currently a telecom law that emphasises the introduction of universal services in Oman which means that OmanTel and any new ICT company must provide ICT services to rural areas according to the law.

Officials from the government confirmed the government plans to enhance and develop the e-readiness, IT awareness and knowledge of Omani society. A highly-ranked official from the Ministry of Finance stated that currently there are computer labs and courses being introduced within the secondary education level in Oman. There are also plans to introduce the same within primary education. ICDL is being introduced to government employees and plans are set to use ICDL as a minimum requirement for any form of employment in the government sector. In addition, the Undersecretary of the Ministry of Commerce and Industry explained that Knowledge Oasis Muscat is an IT park that was built to enhance Oman's ICT capacity. It has been developed to

increase the number of IT-skilled people, and IT awareness about ICT's potential in Oman. It also serves to attract local and foreign investment in IT and encourage local young entrepreneurs to incubate their own IT businesses. Training institutes on the other hand are available all over Oman, which can help in educating non-computer-savvy people. The Undersecretary also added that many public organisations had solid plans for introducing IT training to their employees and the general public. Private IT colleges in Oman were encouraged and supported to offer IT degrees and advanced IT training to residents. The Ministry of Higher Education sponsored many students to join these private IT colleges and the Ministry of Manpower had established training programs for secondary school graduates to qualify them for their preferred jobs.

E-government Willingness and Adoption: Finally, the surveys revealed that people willing to undertake e-commerce activities are more likely to be willing to use e-government services in Oman. People's willingness to adopt e-applications varies according to many factors as described above. The willingness of organisations to go online or adopt new technologies varies also. Officials from the private sector indicated that private organisations usually choose to adopt new technologies according to the people's readiness and willingness. They claimed that private institutions usually survey people's capabilities and readiness before introducing new technologies. For example, an official from Oman Arab Bank (OAB)mentioned that, "OAB does not follow other banks' IT attempts and e-initiatives but always questions people's readiness to use such systems". He provided the example of internet banking and stated that, "…a feasibility study was conducted a while ago on internet banking and it was seen to be unfeasible. Nowadays, current indicators show that OAB should start thinking to introduce internet banking in the near future. Despite this, it is not seen to be of an urgent matter since adoption rates is not that promising yet". In his view it was preferable to establish the

proper timing to introduce the service and meet all its prerequisites. He went on to explain that, despite how promising an e-government system is for the general public, private organisations in Oman will usually be guided by people's needs, understanding and capabilities in any future interaction with e-government in Oman.

The government's progress in enhancing and developing its ICT sector was seen as a vital factor to increase IT adoption and initiatives in Oman. An official from Oman TradaNet stated that, "…there is a limit to what we can do and we progress as the government progresses in IT". In addition, businesses in Oman are seen to be highly dependent on government purchasing. On the other hand, time is crucial for people to absorb and understand new technologies. Companies and government institutions were advised by many interviewees to try to cope with complaints and resistance in the early stages until users get used to the new system. For example, an official from ROP described people's adoption of their website: "When ROP launched online visa status service, the hits increased drastically and reached about 12,000–15,000 hits a month. In many instances, the inquirers were not satisfied or maybe didn't believe the results from the website and often tried to call and/or physically report to the Directorate General of Passports and Residence to recheck."

Fear and resistance to change are other key barriers to adopting new technology. Officials from the private sector explained that people simply hate change because they perceive it as requiring extra effort and time to absorb and understand, and they are simply resisting being given extra new work. Other people simply have the idea or stereotype, "I hate computers", due to some bad experiences in the past and they will try to resist any type of interaction with computers. Fears, on the other hand, could be minimised by continuous awareness campaigns. Interviewees saw the current marketing

campaigns as inadequate and believed more effort is needed to inform people about the existence and benefits of e-government initiatives.

One private sector official stated that companies are somewhat hesitant to go online because either they are not ready (technically, financially, or culturally) or they lack transparency (i.e. don't want/are unable to provide crucial information to the general public). Government officials confirmed the government commitment to support and help the private sector to be more IT-oriented. An official from the Ministry of National Economy mentioned that the creation of e-Oman and e-government aims to provide more opportunities for the private sector to earn a competitive edge through establishing links with various government institutions in order to perform services on behalf of people. For example, an insurance company could seek authorisation from ROP to renew driving licences and/or car registrations on behalf of its customers. This would make the government more of a regulator of the services than a provider, and allow the private sector to become more active and competitive.

6.3.3 Relationships: Summary

This section described the techniques used to reach valuable conclusions about key variables and the relationships between them. Figure 6-7 illustrates the major correlations achieved around the key central variable, "Willingness to use e-government".

In brief, the following key positive correlations were observed:

- Age (except ages 40 and above), education and income correlate positively with IT literacy (computer, internet and e-commerce literacy) and willingness to use e-government.
- Users' IT literacy and willingness to use e-government have a positive relationship.

- Users' willingness to use e-commerce and e-government are affected by the same key independent variables.
- Users' awareness about e-government in Oman or in general correlates positively with their willingness to use e-government.

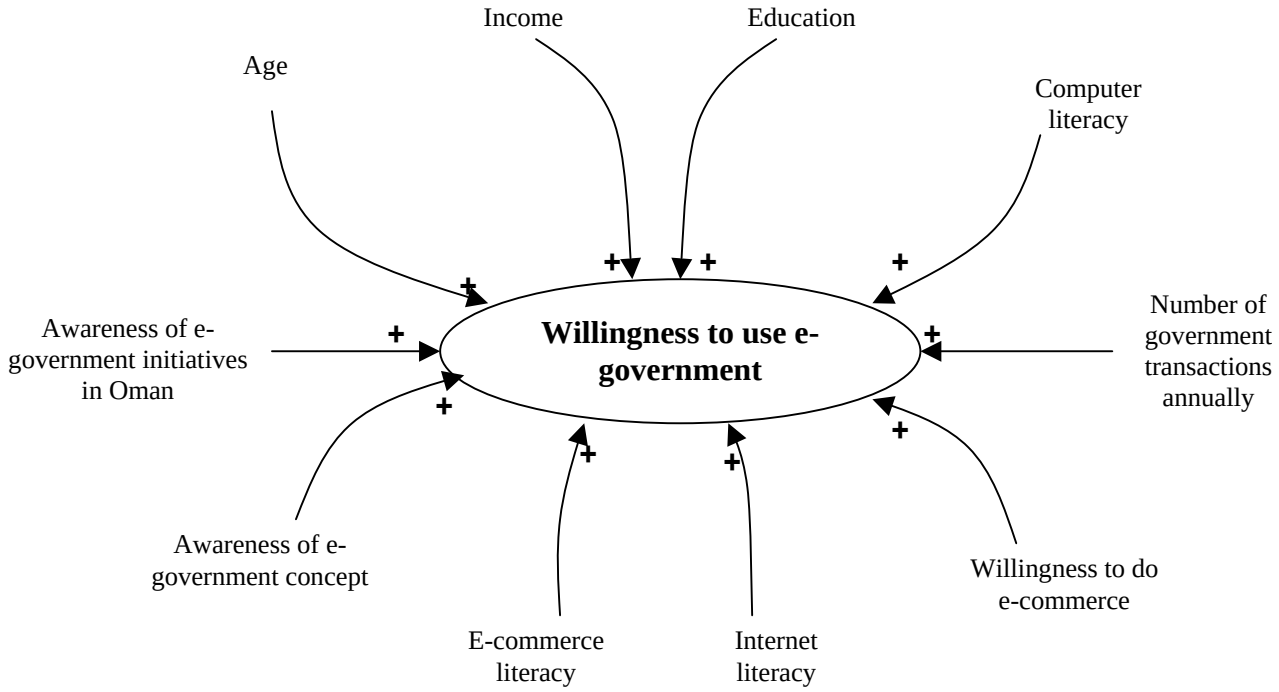


Figure 6-7: Key correlations against willingness to use e-government

Other key findings about the characteristics of e-government and targeted users in Oman, as represented by the study's participants, were as follows:

- E-government initiatives and plans in Oman are very much under-marketed.
- Younger people (below 40 years old) are more likely to use and adopt new technologies in Oman.
- The society's e-readiness greatly influences private-sector willingness to adopt initiatives in the ICT field.
- The private sector in Oman depends heavily on government purchasing and advancement in the ICT domain.
- Work activities may significantly influence people's IT literacy and therefore their willingness to use e-government, even if they fit in the right age, education and

income class. Resistance to change and lack of IT knowledge and awareness may exist among highly educated people also.

- Trust and fear are still barriers to IT adoption that require time and proper planning to be mitigated.
- Some key advantages of e-government such as transparency, for example, may also act as possible obstacles to adoption depending on people's norms and beliefs. A highly-ranked official from the Ministry of Finance stated that, "…transparency is one of the main advantages of e-government and a possible hindrance also, since it is difficult for computers to differentiate between users, a feature that might not make some people happy".

Many interviews revealed that citizens' unawareness about e-government and its benefits might mean they will not ask for and/or complain about its availability, especially in the short term. Currently issues pertaining to healthcare, education or transportation would be more relevant and important to them. It is only when people fully understand and start believing in e-government's potential and benefits that the government might suffer if it lagged behind its development plans. This stresses the importance of being ready to contain people's expectations at the time of advocating awareness about e-government and IT in general. A senior public-sector official stated that, "…in spite of all the current obstacles to e-government in Oman and the fact that e-readiness is still not there, we still need to go ahead with the project to increase people's awareness and to start making plans and strategies for development. The idea here is to increase users' trust by preparing them to be e-ready well in advance. This also will make government and leadership gradually accept the idea of being ready 24/7." In the next section, the barriers to e-government adoption and dissemination in Oman and their relationships with key variables are examined.

6.4 Barriers to E-government Adoption

The previous sections provided some insights and findings about barriers to e-government adoption in Oman. Here, the major barriers are examined in more depth to discover the relationships and impacts of the key factors (mentioned earlier in Table 6-2) on participants' perceptions and attitudes towards those barriers. There were 13 main barriers listed in the survey draft as follows, and participants were asked to rank them on a scale of one to five where one indicates least relevance to the Oman case and five represents the highest relevance:

- Barrier 1: Users' lack of IT knowledge, awareness and motivation
- Barrier 2: Lack of skilled IT staff
- Barrier 3: Internet and computer cost
- Barrier 4: Lack of user trust and confidence
- Barrier 5: Lack of security
- Barrier 6: Culture and language conflict
- Barrier 7: Poor infrastructure and technologies
- Barrier 8: Top officials' lack of commitment and understanding
- Barrier 9: Bad project control and management
- Barrier 10: Lack of user input and feedback
- Barrier 11: Lack of funding
- Barrier 12: Lack of proper legislation and laws
- Barrier 13: Lack of marketing campaigns.

6.4.1 Adoption Barriers: Surveys

Previously in section 6.2.1, the top five average scores gathered for all barriers as indicated by the 140 survey participants were described. Here, further analysis has

been conducted to find out the effects of key variables on participants' decisions to categorise the relevance of barriers to the Oman situation. Basic frequency distributions for grouped variables and correlation techniques were deployed.

Age, Education, Income: As noted earlier, the five barriers ranked the highest in relevance to Oman were, in the following order:

- Barrier 1: Users' lack of IT knowledge, awareness and motivation
- Barrier 13: Lack of marketing campaigns
- Barrier 12: Lack of proper legislation and laws
- Barrier 4: Lack of user trust and confidence
- Barrier 7: Poor infrastructure and technologies.

Figure 6-8 illustrates the average scores for each barrier categorised by participants' age classes. In general, the chart shows a positive trend between these barriers and age classes. A minor decline is noticed, though, within age class 20 to 30.

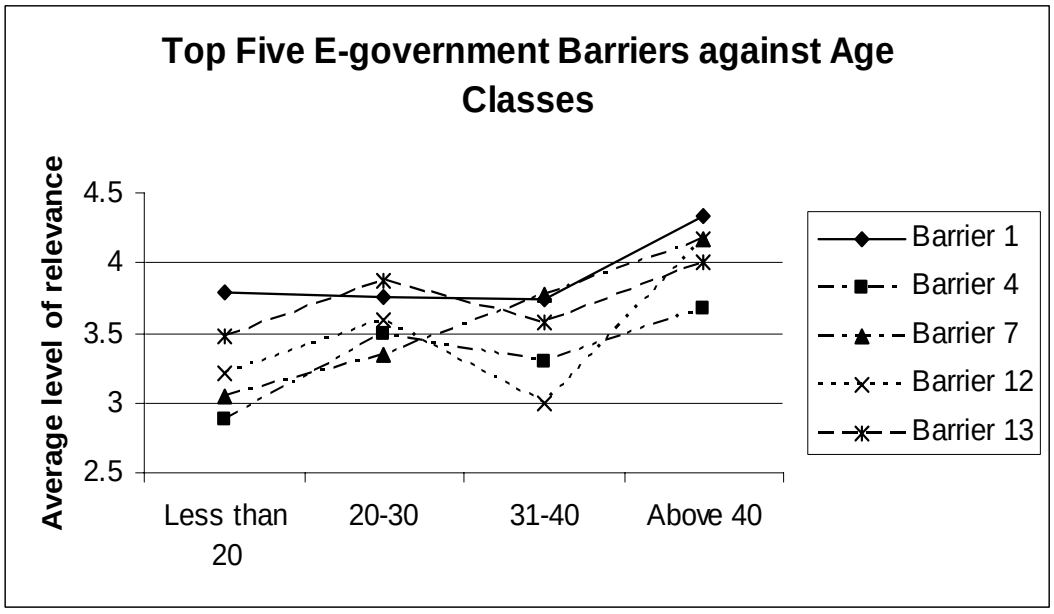


Figure 6-8: Key barriers to e-government against participants' age ranges

Correlation tests were performed between age and barriers to e-government adoption to provide more solid conclusions. Table 6-5 shows the correlation results

between age and the five highest-ranked barriers. Further correlation results between age and the remaining barriers to e-government adoption are provided in Appendix C. Correlation coefficients were found to be mainly positive and significantly above zero. Therefore, age is seen to have a positive relationship with the majority of perceived barriers to adoption.

Table 6-5: Correlation coefficients for age and key e-government barriers

	Barrier 1	Barrier 13	Barrier 12	Barrier 4	Barrier 7
Age	0.727	0.662	0.575	0.830	0.996

The same methods were adopted for education and income (including secondary and undergraduate students) variables. Figures 6-9, 6-10 and Table 6-6 show the results of examining relationships between education and income, and the top five barriers to adoption. Other results for the remaining barriers can be found in Appendix C.

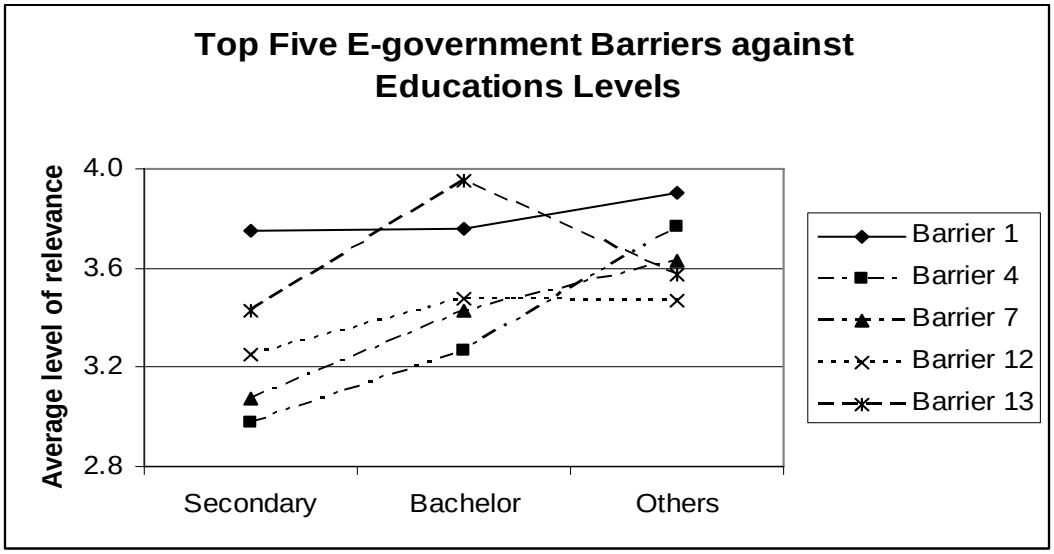


Figure 6-9: Key barriers to e-government against participants' education levels

Table 6-6: Correlation coefficients for education, income and key e-government barriers

	Barrier 1	Barrier 13	Barrier 12	Barrier 4	Barrier 7
Education	0.794	0.788	0.806	0.880	0.852
Income	0.146	-0.271	-0.072	0.168	0.978

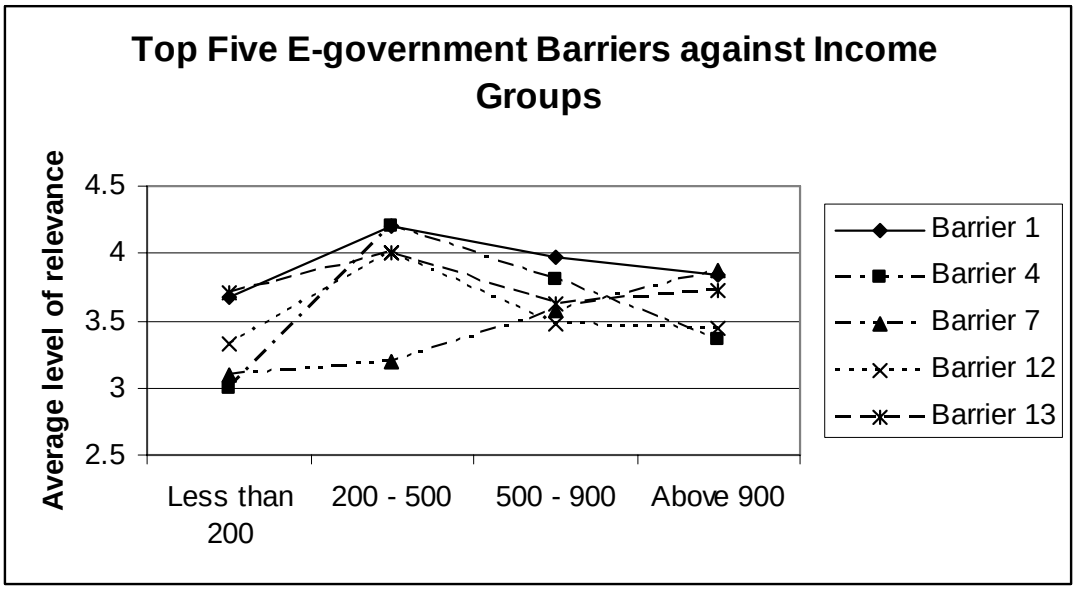


Figure 6-10: Key barriers to e-government against participants' income classes

Correlation results between key independent variables (age, education and income) and perceived barriers to e-government adoption in Oman revealed the following key findings:

- Age correlates positively with all the barriers except barrier 3, "internet and computer cost" with a correlation coefficient of minus 0.83. This means that the older the users, the less likely they perceive internet and computer costs as an issue in e-government adoption.
- Education has a positive relationship with the 13 barriers investigated in the survey. This indicates that the better educated the participants were, the better their understanding and therefore the more highly they ranked the importance and relevance of the barriers to Oman.
- Income showed a varied behaviour with the barriers examined when secondary and university students are counted. In this case, it was found that income correlates positively with the majority (8 out of 13) of the barriers. Minor negative correlation coefficients were observed between income and:
    - Barrier 3: (minus 0.022) internet and computer costs

- Barrier 10: (minus 0.312) lack of user input and feedback
- Barrier 11: (minus 0.226) lack of funding
- Barrier 12: (minus 0.073) lack of proper legislation and laws
- Barrier 13: (minus 0.271) lack of marketing campaigns.

The small negative coefficients do not suggest a solid judgment about the relationships. Therefore, another method was adopted to examine further and resolve this issue. Chi square analysis was performed between income levels and the different barriers shown above. One of the contingency tables is illustrated in Table 6-7. Contingency tables for the four remaining barriers are presented in Appendix C.

Table 6-7: Chi Square contingency table for income and barrier 3

	Relevance - Barrier 3					
Income	**Very low**	**Low**	**Neutral**	**High**	**Very high**	**Totals**
Less than 200						
Actual	14	14	25	10	16	79
Expected	12.59	14.31	22.90	14.31	14.88	79.00
Chi Squared	0.16	0.01	0.19	1.30	0.08	1.74
Between 200 and 500						
Actual	0	2	0	2	1	5
Expected	0.80	0.91	1.45	0.91	0.94	5.00
Chi Squared	0.80	1.32	1.45	1.32	0.00	4.89
Between 500 and 900						
Actual	5.00	6.00	7.00	4.00	8.00	30.00
Expected	4.78	5.43	8.70	5.43	5.65	30.00
Chi Squared	0.01	0.06	0.33	0.38	0.98	1.75
Above 900						
Actual	3	3	8	9	1	24
Expected	3.83	4.35	6.96	4.35	4.52	24.00
Chi Squared	0.18	0.42	0.16	4.98	2.74	8.47
Totals	22	25	40	25	26.00	138.00
					Total Chi Square	**16.86**

In this instance (Table 6-7), with 12 degrees of freedom and significance level set at 0.05, chi square values of up to 21.03 are expected to occur by chance. Consequently,

the chi square value obtained (16.86) points out that there is most likely no relationship between the two variables. Hence, this stresses that the minor negative correlation coefficient obtained earlier might partially reflect the overall trend between the two variables and that an explicit vital connection is not available. In addition, chi square values for barriers 10, 11, 12, and 13 respectively are found to be 10.65, 23.81, 7.44, and 8.34. All showed an insignificant chi square value except barrier 11, "lack of funding", whose value exceeded the 21.03 limit. Despite this, the difference is still seen to be inadequate to suggest a vital connection between the two variables. In brief, the negative correlation coefficients describe the overall trend between income and those barriers only.

- When students are discounted, income demonstrated clearer trends with barriers. In this situation, income showed significant negative relationships with all barriers except:
    - Barrier 2: Lack of skilled IT staff (scored a correlation coefficient of 0.820)
    - Barrier 7: Poor infrastructure and technologies (achieved a correlation coefficient of 0.999)
    - Barrier 8: Top officials' lack of commitment and understanding (with a small correlation coefficient of 0.082).

  Table 6-8 below shows the correlation results between income and key e-government barriers when students are discarded (refer to Appendix C for a full list of correlation results of this instance).

Table 6-8: Correlation coefficients for income (excluding students) and key e-government barriers

	Barrier 1	Barrier 13	Barrier 12	Barrier 4	Barrier 7
Income	-0.987	-0.726	-0.889	-0.999	0.999

IT Literacy: The same methods performed earlier between key independent variables (age, education and income) and barriers to e-government adoption were employed also on IT literacy variables (computer, internet and e-commerce literacy). Since these are binary variables, zero and one were used to indicate non-literate and literate participants respectively in the Excel sheets. Please refer to correlation results in Appendix C. It was found that:

- Computer literacy correlates positively with all barriers except barrier 13 ("lack of marketing campaigns").
- Internet literacy showed a positive connection between all barriers except with barriers 9 ("bad project control and management") and 10 ("lack of user input and feedback").
- E-commerce literacy correlates positively with all barriers except barriers 6 ("culture and language conflict"), 10 ("lack of user input and feedback") and 11 ("lack of funding"). Barrier 9 was seen to have no relationship to e-commerce literacy as average scores for both literate and non-literate were equal.

E-government Willingness and Awareness: The associations between participants' willingness to use e-government and their awareness about e-government initiatives in Oman on one side and the 13 barriers on the other are examined. Figure 6-11 shows the relationship between the key central variable to this study (willingness to use e-government) and the top five barriers to e-government adoption (complete correlation results are provided in Appendix C). It is obvious that a negative relationship exists between them. This argues that the less likely people are to use e-government, the more they perceive these barriers as vital inhibitors and obstacles to its adoption. Correlation tests confirmed this finding and also showed positive relationships between willingness to use e-government and barriers 5, 6, 8, 9, 10 and 11.

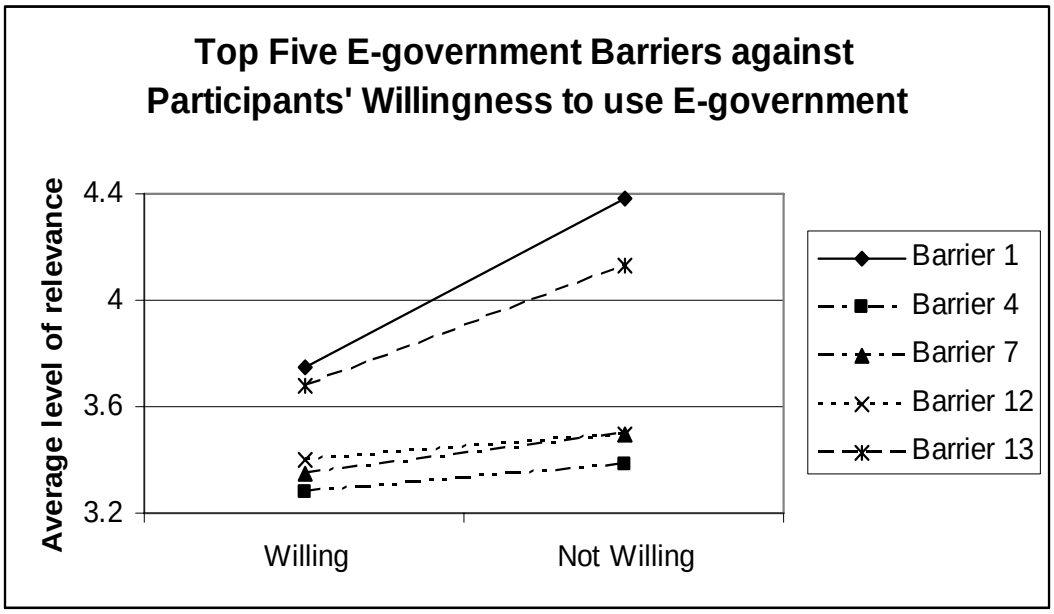


Figure 6-11: Key barriers to e-government against participants' willingness to use e-government

On the other hand, users' awareness about e-government initiatives in Oman showed positive relationships with all barriers except the following:

- Barrier 2 ("lack of skilled IT staff"): this may indicate that people's unawareness about plans for and development of e-government in Oman make them more likely to think that Oman lacks skilled people in the IT field.
- Barrier 3 ("internet and computer costs"): one possibility here is that the more aware participants are about e-government initiatives in Oman, the less likely they feel that internet and computer costs might act as an inhibitor.
- Barrier 10 ("lack of user input and feedback"): this may suggest that the less aware participants are about e-government in Oman, the more likely they believe that user input and feedback are disregarded.
- Barrier 11 ("lack of funding"): this indicates that the funding issue may not be perceived as a barrier by highly e-government-aware participants.

- Barrier 12 ("lack of proper legislation and laws"): participants unaware about e-government initiates in Oman may recognise this as a barrier of high relevance to e-government adoption.

Note, however, that all of the conclusions above are somewhat speculative and require further investigation.

6.4.2 Adoption Barriers: Interviews

Interview results are used to provide an extended examination of the findings reached from the surveys. Surveys revealed the relationships between the central research variables and perceived barriers to e-government adoption. These factors were seen to have impacts on both the service providers and users. Many vital e- issues affecting e-government adoption in Oman were discussed in the interviews also. The following outlines those issues.

Users' needs and expectations: All officials interviewed from the public and private sectors agreed that the best approach for e-government development and implementation should be citizen-oriented. The focus should be placed upon users' needs rather than simulating government functional areas. An official from the Ministry of National Economy stated, "…e-services should be focused upon customers' needs rather than organisational needs. In addition, this should be affordable and within the budget of normal citizens". Another official from the private sector indicated, "…e-government should interact with all levels and segments of the society, and every member of the society should benefit from it. In addition, e-government applications should be designed carefully in a way to facilitate accessibility". Furthermore, developers must ensure friendly, easy-to-use interfaces and error-free applications. Many officials indicated that there is little chance people will keep trying faulty sites or systems. Further, with the power of "word of mouth", a negative image might be

projected on an organisation's services if users tend to experience faulty interactions—a view attested to by many officials from the private sector. Apparently, many people have formed a bad image about OmanTel's Services. For example, an official from PDO indicated that, "OmanTel is seen to be lagging behind in terms of its ICT facilities and services compared to neighboring countries (such as Dubai for example). Seeing is believing; people see the services are poor and time-consuming, and hear many complaints". Containing users' expectations in this regard was seen to be crucial. People should understand the benefits of IT systems before they are asked to use them. An official from PDO stated that currently in Oman for example, telephone bills show only the total amount to be paid. People compare such a service with a similar one in Dubai where bills come with detailed information about phone calls like duration and cost. Such incidents negatively influenced people's trust and expectations about the services of OmanTel. The private-sector official added, "It was found that not many people respect or have trust in OmanTel's services in Oman, but they keep using them because they do not have other options as it is the sole ICT provider". This is to be changed as soon as the government completes the implementation of plans to privatise the company and open the ICT market for foreign investment. In addition, an official from Oman TradaNet indicated that, "OmanTel's current services cause a major obstacle towards IT adoption and dissemination in Oman. The company's iX2 system was highly affected by how slow and inconvenient internet connections are in Oman".

The interviews provided a good example about containing expectations with Oman Arab Bank when it had to deal with users and leadership expectation after launching their smart card system for payment purposes. An official from the bank explained:

> *At the beginning, the adoption and acceptance of the smart card system was very poor. It was mainly the fear of loosing [sic] money the main hurdle. This caused lots of complaints internally among the bank's higher management levels about the viability of the system. Apparently, they had high expectations for fast results at first but after a while, many businesses and users started to utilise this initiative. The Oman e-government project also helped in the uptake of this system. Businesses also started to understand that the smart card system which enables them to embed money inside smart cards prevents their agents from misusing the money."*

Many officials also stressed the need for several options to accommodate all users' needs and capabilities, especially when it comes to e-payment for example. Officials from the public and private sectors recommended that one or two options could be used initially with a clear indication to users that other means would follow soon. In addition, when it comes to paying bills online, all major kinds of bills must be available to be paid online or else the adoption rate will be affected. An official from PDO stated that, "If I can pay internet, mobile and home phone bills online, but still I'll need to go to pay my water and electricity bills physically, then perhaps I'll do all of them physically and save myself the worry."

Trust and Security: Trust and fear are ever-recurring issues when it comes to adopting new ways to conduct business. Some people do not trust their own government when it comes to using its e-initiatives. An official from the private sector indicated that, "Many citizens in advanced nations like UK and USA have a trend of not trusting IT programs or projects initiated by their government. This would be apparent also within the Omani society in any IT based application such as e-government".

Organisations must seek to earn users' trust through normal transactions before they attempt to do so in their online services. It is found generally that when clients are dissatisfied with an institution's manual services, it is unlikely that they will be willing to use its e-initiatives. For example, an IT manager from the public sector indicated that, "I don't trust the company collecting the money due to many calculation mistakes on my previous bills. This does not encourage me to use their online system. If they can not get bills right from time to time, how would they be successful in building an IT-oriented system that [is] supposed to be totally new to them?"

Emphasising solid security measures and adopting online legislation and laws are seen to be vital in mitigating this issue. An official from Oman Arab Bank indicated that, "The only problem I see is security and privacy issues. Online laws and legislations are not complete even worldwide because its hard to detect who committed the crime as there are many ways to hide one's identity and location. Technology advances in both ways, in security and in breaking in also". Another highly-ranked official from Muscat Municipality stated that security is very vital for e-government and should be viewed as a main priority. He elaborated that e-government systems hold crucial information about the adopting institution and its clients, and therefore should be protected. In addition, he emphasised that any security breach in such systems would damage not only the company's systems, but its image and credibility also. Then again, planning for security should be done thoroughly but should not become an obsession. IT managers from PDO claimed that PDO's concern about security measures causes the IT department to consume long periods of time examining and assessing new applications. This was even witnessed with the SAP system as it took about two years for investigation. In the public sector this issue was observed in ROP also, as an official stated that, "ROP faced lots of security fears before going online".

Developing proper e-legislation is crucial to support and resolve security and trust issues. The lack of such legislation might inhibit and discourage people and businesses from going online. The head of the e-commerce division in Oman TradaNet indicated that, “Lack of proper legislations makes all documents used in the iX2 system unofficial from government point of view, and tends to inhibit the public sector from adopting such application”. He goes on to state that a virtual tender box and online payment applications are ready to be launched soon by the company but still await the proper infrastructure and e-laws. As an example that e-laws helps to increase people’s trust in online systems, an official from the private sector indicated that, “I’m very conservative when it comes to buying online despite my work and knowledge about IT and internet security. The problem is that the system in Oman does not protect me yet, so I have to take care of my own protection.”

Culture and Language: Many cultural and country-specific factors were highlighted in the interviews. An official from the private sector stated that, “One possible perceived drawback to e-government is lack of interaction with real people. People who used to do things through contacts in public departments won’t have that luxury any more. Transparency would be perceived as an inhibitor by some key decision makers”. Cultural issues are apparent also when it comes to performing online payments. A small number of officials with a strong IT background showed a negative attitude towards paying bills online. One official who happened to be the IT manager in a public institution stated that, “Although I have [a] positive attitude about online payments since I’ve done it several times outside Oman, sometimes I rather go out and stay in queue as an attempt to socialise and perhaps as a means to escape from computers.”

Gender was also seen as a factor that might be affected by culture in Oman and therefore might influence technology acceptance. A senior official from the Ministry of Civil Status claimed that, "Mostly the internet and e-government users would be females. This is due to some cultural issues where women are required by tradition not to go out alone and usually they stay longer times at home. This will encourage them to use the e-services at home more and more as it is more reliable and convenient". He also stated that this fact was reflected on the ministry's website, as most users were women.

A language barrier is also evident when it comes to new technologies. An official from PDO told how this issue caused misunderstanding at the time of launching SAP and training the company employees on its use. He said that, "SAP officials from Germany explained the system to Dutch and Italian trainers in PDO, who then presented the training seminars to Omanis with different levels of English knowledge". The result was misinterpretations caused by the varying accuracy of translations. The Undersecretary of the Ministry of Commerce and Industry also pointed out that, "Language is an explicit barrier to any e-systems in Oman and the Arabic-speaking countries. This is apparent currently in the e-banking systems in Oman where interfaces are displayed in English only and adoption rates are low." In addition, a lot of planning has to be done regarding rural areas. Many officials stated that cultural issues are most likely to be apparent there, and that the dilemma is how to get rural people to accept doing online transactions despite the current poor infrastructure and low level of computer literacy among the rural population.

E-readiness: The head of the e-commerce division in Oman TradaNet stated that, "[The] first question to ask before introducing IT applications in Oman is: are people capable of using it? Second will be: are they willing to use it?" User and service

provider e-readiness is vital to the adoption and dissemination of any IT-based initiative. People's e-readiness was seen to be relatively low in Oman, a factor that significantly affects the willingness of companies to adopt new technologies. A highly-ranked official from Bank Muscat indicated that, "There is a large volume of customers who visit Bank Muscat branches for basic financial transactions like cash withdrawal despite the enormous spread of ATMs around the sultanate". He goes on to add that the level of e-readiness in Oman impacted users' adoption of the bank's internet banking system. This confirms many comments made by private-sector officials that private organisations usually choose to adopt new technologies according to people's readiness and willingness. The public sector is affected also by the society's level of e-readiness. An official from the Ministry of Civil Status explained that after the ministry's new website was launched with new online services inviting the public to apply directly for job openings in the ministry, many job-seekers were unable to understand how to do the tasks online. This resulted in many applications that did not address the job requirements.

Resistance to change is a normal consequence of poor e-readiness among users and employees. An official from Oman TradaNet claimed that when the company introduced the iX2 system, which is a B2B solution enabling the transfer of e-documents over secure lines, many employees and employers resisted it at the beginning. He added that creating the need for an improved solution using an IT-based application would alleviate such problems. For example, PDO's procurement department used to receive about 2000 documents daily which needed to be followed up and tracked throughout the company. The need for a revamped solution helped to improve people's adoption of the iX2 system.

Leadership Support: The head of the information systems department at the Ministry of Finance emphasised that support from leadership is the most important factor of all for e-government implementation and dissemination. He commented that, "If IT vision is not within the top priorities or not seen as a main contributor to an advanced knowledge-based economy, many vital development initiatives such as IT education will be overlooked or postponed. Leadership support might influence heavily the allocated resources of each institution for technology and e-government adoption." The Undersecretary of the Ministry of Commerce and Industry stated, "Leadership and top officials' commitments and enthusiastic to [sic] IT is so vital. It can increase or decrease the allocated budget for IT adoption and development in each organisation". He also added that budgets in general cannot be allocated lavishly to increase the IT awareness of all people. Some government institutions have good budgets and the commitment of their top officials to IT; others have a low budget allocation to IT and some organisations, for example ROP, cannot afford not to be IT-driven.

In addition, driving forces are essential to the development of the ICT sector in Oman, a factor that is highly influenced by the level of leadership support. The general manager of the information systems department in Muscat Municipality claims, "We won't improve our infrastructure if there is no driving force for it such as adopting e-government or e-commerce. This is why we have to work in parallel. We only started to develop e-legislations when we were forced to, when we tried to enhance people's trust and promote e-services take-up."

Process Re-engineering: The head of the information systems department in the Ministry of National Economy stated that, "…e-government is not only about offering electronic services to people but most importantly involves simplifying or reengineering processes, enforcing accountability and setting the needed legislations to protect

people's rights". E-government should be viewed as a win-win situation. Both providers and users should benefit from it even when it seems to have a disadvantage. A senior government official indicated that, "One of e-government hurdles is the perception that e-government is associated with loss of jobs. People may think they might lose their jobs or their power by shifting to e-government. Adopting e-systems might cause some people to be redundant at work and will require training. This issue is overlooked and there is lack in proper budgeting for training in these instances". This stresses one of the main benefits of e-government: that is, improving the internal processes as well as the external ones.

In addition, ICT planning seems to be taking longer than expected. An official from the public sector, who happens to be a member of the Information Technology task Force (ITTF) which is responsible to set IT plans for the country, claimed that, "The roadmap for e-government implementation in Oman has been developed, but the execution is [a] bit slow". Other officials from the private sector criticised the fact that information integrity and accuracy have not been taken into consideration within the national people's database. An official from Bank Muscat stated, "…e-commerce and e-government need a solid citizen database but with such lack of transparency and people's hesitance to provide accurate information, keeping information up-to-date is becoming very difficult. In general, the collected information, such as dates of birth, addresses and telephone numbers, is not correct or invalid. This leads us to another dilemma: how long we need till we correct this information?"

This point stands on the fact that some government institutions such as the Ministry of Commerce and Industry and Muscat Municipality might have more up-to-date information because clients are required to renew their contracts or licences annually (i.e. update information). Others such as the Police and Immigration

Department are likely to have outdated information as people need to renew passports, ID cards, and driving licences only every 5 or 10 years. This emphasises that people should be urged to update their information regularly whenever a change happens.

Infrastructure and Integration: Despite the many plans to enhance the country's ICT infrastructure, many officials stated that it is still deficient and integration between organisations is poor. An IT manger in PDO indicated, "No plans as of yet to connect to government organisations electronically for many reasons. The ministries are seen to be not yet technically ready". The head of the Technical Secretary which is responsible for setting e-government plans in the country, explained that different ministries currently have their own silos of information (functional applications and networks). Each ministry works and develops its own infrastructure independently. Such systems need to be reassessed and interconnected in order to achieve a comprehensive e-government architecture. This is planned to be achieved by building a gateway or portal in front of the silos, and a middleware to connect both ends. The official further elaborates, "The more entrenched legacy systems in the form of silos we have, the more difficult it is to achieve coordination and integration between different ministries". This is seen to be due to the fact that IT departments in public organisations, as well as private companies responsible for maintaining systems, might very well resist any integration that will override or erase their legacy systems. Companies may fear losing maintenance contracts and IT departments may fear losing their own systems. In addition, it is also very costly to demolish such huge silo systems.

Many officials emphasised the strong need to establish an independent entity with an authority in Oman to oversee this issue. Officials from the banking industry indicated that there is a need to establish coordination between organisations (private and public) in Oman in order to come up with common standards and payment methods

for the public benefit. Despite this, they believe that it is very hard to do this because of the many different programs and databases available within the various organisations in Oman. This issue is affecting the drive of many businesses to be more e-oriented. For example, an official from Bank Muscat described the adoption of their internet banking project: "…people will be more inclined to use internet banking when it can serve many purposes and is integrated with many other organisations such as travel agencies, governmental ministries, and other companies."

ICT Access and Development Costs: This involves the cost for users to access e-services such as the internet, computer and other costs associated with using online services. Internet costs in Oman are still seen to be high. An official from the private sector indicated that, "The limited internet bandwidth in Oman makes OmanTel try to balance the number of internet subscribers with the number of hours they spend on the internet—because they can only handle this number at a time. This is possibly the reason behind the hourly cost scheme adopted by OmanTel. They cannot simply accommodate all subscribers at the same time, in [their] aim to solve internet bottlenecks as well".

Despite the notion that such costs might discourage people from utilising e-government services, many officials indicated that it is not as problematic as it sounds. An official from Oman Arab Bank indicated that, "I don't see cost as [a] possible barrier to e-government. Despite this, computer education is maybe a concern and might be a barrier as it's more expensive than owning a PC or paying for few hours on the internet". Other officials expressed more concerns about project funding than on access costs. An official from PDO indicated that, "…funding issue might arise sooner or later because of a recent decline in oil production in Oman. E-government project might not be seen as high in priority as other projects such as education, health and

transportation". This stresses the fact that since oil revenues are not expected to last forever in Oman, this would force officials to focus more on short-term plans in which a project like e-government would be highly affected.

IT Knowledge and Expertise: The surveys revealed that IT literacy in Oman is relatively low. Officials claimed that most IT companies in Oman are currently acting like brokers where they tend to outsource jobs to IT companies from other countries such as India. KOM has been established to mitigate this issue as it aims to incubate real IT businesses and promote local IT entrepreneurs. Many officials interviewed indicated that some IT initiatives in Oman caused more delays and complaints than they eased in daily workloads. For example, computers were introduced in public clinics where doctors were asked to type in patient information and prescriptions. Because doctors were not trained correctly to type fast, they took a longer time to type information using PCs than they used to when entering data manually on paper. In addition, lack of integration between small public clinics and hospitals made it hard for other doctors to track down patient history information. This stresses the importance of adopting technologies not for the sake of technology, but for the purpose of simplifying processes and improving citizens' experiences. Officials also indicated that lack of know-how inhibits businesses and governments from launching and adopting IT-based projects. For example, an official from the private sector stated, "OmanTel is working hard to adopt up-to-date technologies and hardware but a main key factor that inhibits its success is lack of IT skilled knowledgeable staff".

6.4.3 Adoption Barriers: Summary

Factors influencing participants' attitudes towards the barriers to e-government adoption have been examined. Figure 6-12 illustrates the major findings in this regard

surrounding issues central to this study: willingness to use e-government and awareness of e-government initiatives in Oman.

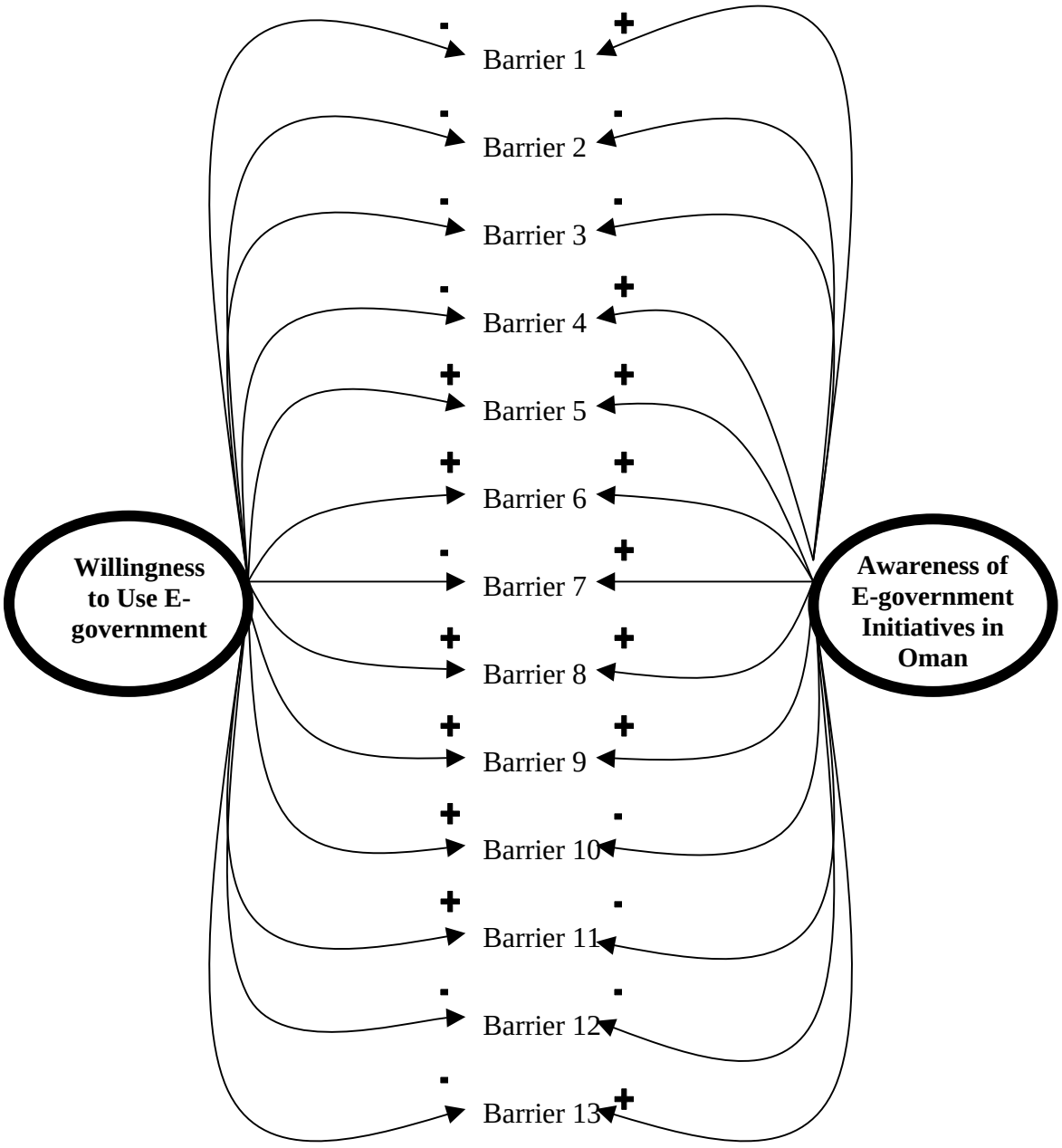


Figure 6-12: Relationships between participants' willingness and awareness about e-government and barriers to adoption

In general, the foregoing analysis exposed the diverse relationships between key variables and barriers to adoption. The main indication is that participant characteristics such as IT literacy, education and income have a clear impact on their views and ranking of the perceived barriers to e-government adoption.

Chapter seven further examines the findings from chapters four, five and six to provide insights and recommendations for the Oman e-government project. A detailed profile of expected e-government users in Oman is illustrated using findings from chapter six. In addition, the ultimate aim of the study, “E-government Framework for Adoption”, is presented.

7.0 Oman Case Study: The Way Forward

This is the last of three parts that together aim to present, analyse and address the data and issues gathered from the Oman case study, and finally extract conclusions about the take-up of e-government in Oman. Here, the researcher uses the findings presented earlier in chapters four, five and six to define the major barriers to the adoption and dissemination of e-government in Oman and propose solutions. Chapter four investigated the literature with a focus on advanced nations' experiences in e-government to draw key lessons for adoption and development. Chapter five presented detailed background information about Oman's plans and achievements in improving its ICT sector and e-government project, while chapter six defined the key factors, relationships and critical issues surrounding prospective e-government users in Oman.

This chapter uses the above-mentioned chapters as a basis from which to draw the study's ultimate output: a framework for adoption. In doing so, chapter seven has been divided into four main sections as follows:

- **Insights into e-government development in Oman.** This section uses the information from chapters four, five and six to define the main issues currently influencing e-government development and diffusion in Oman. E-government building blocks and the major issues and outcomes for each phase of development are presented.
- **Insights into e-government adoption in Oman.** This segment utilises the information mainly from chapters five and six to draw a profile of e-government users in Oman and presents the major issues surrounding the uptake of e-government. A Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis was performed on Oman to define the critical issues affecting technology diffusion. In

addition, a list of critical success factors for e-government development and their implications for Oman is compiled, based upon the findings of the SWOT analysis.

- **Insights into the limits to growth of e-government in Oman.** This section describes the major barriers and solutions to the uptake of e-government in Oman as concluded from chapter six. It also presents a set of country-specific factors believed to have inhibited e-government growth in Oman.
- **Roadmap: the way forward.** In this section the major findings of the thesis are combined together to produce a comprehensive framework to e-government adoption, detailing key issues and relationships between them in a causal-loop diagram. In addition, key lessons learned from the experiences of advanced nations are analysed for their implications relevant to the Omani situation.

7.1 Insights into e-government Development in Oman

Chapters four, five and six provided an in-depth explanation of significant issues surrounding e-government development and dissemination in Oman and in the world at large. Advanced nations as well as developing ones were seen to be affected by almost the same issues to varying degrees. This section presents key conclusions drawn from the previous chapters with the aim of assisting Oman to better plan and implement e-government. To this end, a set of major e-government building blocks is illustrated, as are the key issues and outcomes affecting the phases of the e-government development life cycle.

7.1.1 E-government Building Blocks

Several vital elements or components contribute to the growth and proper development of an e-government system. Figure 7-1 depicts five major building blocks

essential for any e-government project along with their critical concerns. The building blocks are defined as follows:

- **E-government system:** is the actual web portal (one-stop-shop) to all government services. This could be accessed either directly through the internet or any other electronic medium, or indirectly through participating agents like internet cafés and service bureaus. The main factors vital to a successful e-government system are usability and the service delivery channels. Usability is concerned mainly with issues such as accessibility, convenience of time and location, and ease of use. Delivery channels are the means of using the system that are available to various types of users, including disabled or computer illiterate people.
- **Leadership:** is the highest level of the government that can make funding and prioritisation decisions related to the e-government project. This might be the president of the country and/or (a) delegated senior official(s) from the public sector responsible for the project. Leadership support and understanding, along with a concrete ICT and e-government vision, are critical issues related to this block. Lack of understanding will greatly influence the level of support leaders give to the project. They should be made aware of the associated costs and expected benefits for both the short and long term. Accordingly, a focused vision and strategy must be developed.
- **E-government entity:** is the hub of all building blocks. It is a dedicated, independent public organisation with adequate official authority to regulate and monitor the development of e-government (i.e. oversee the progress of the other building blocks). In addition, it aims to enhance e-government adoption rates through awareness campaigns and incentive programs as well as setting benchmarks for critical areas such as integration and security.

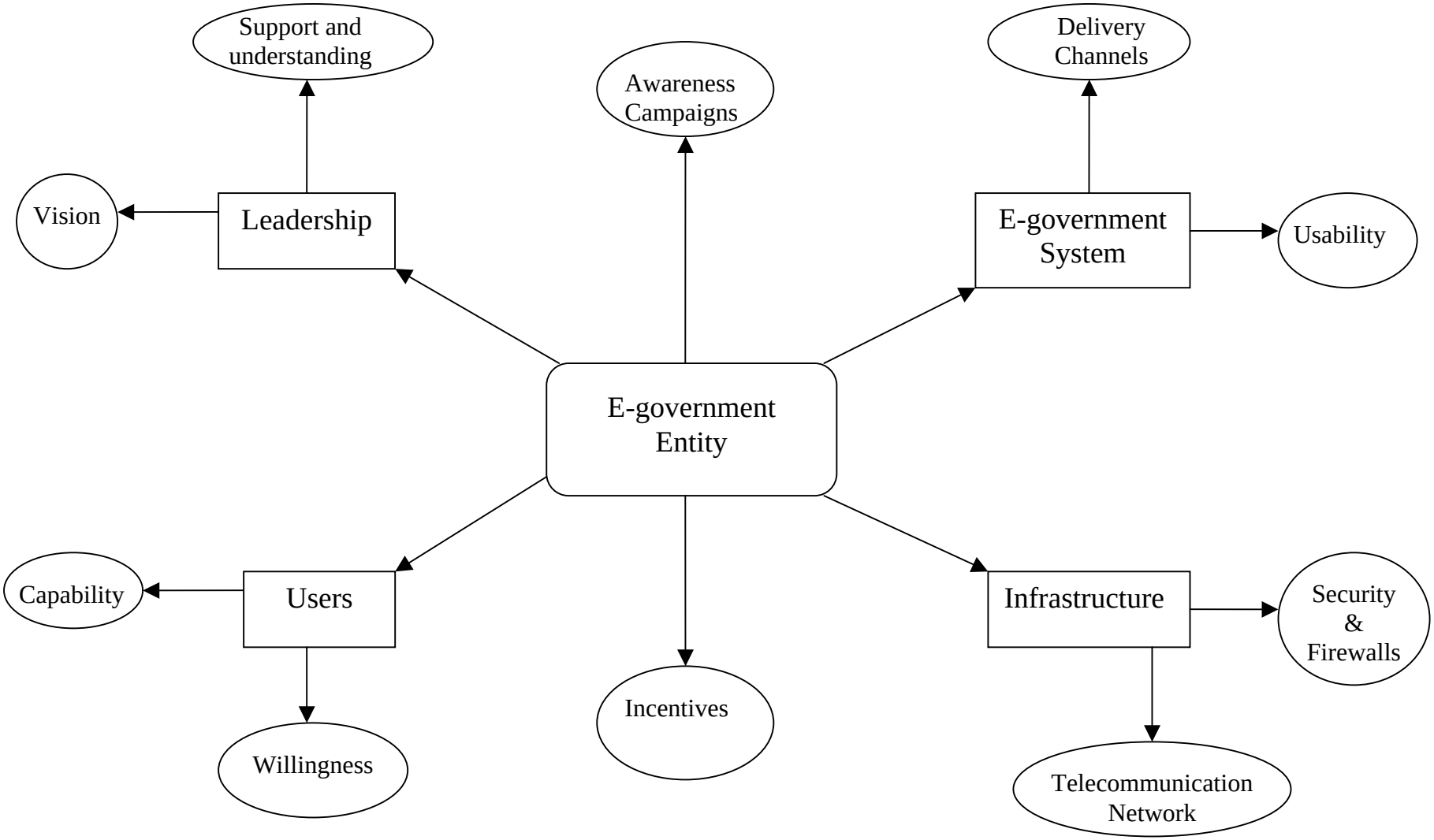


Figure 7-1 E-government development building blocks and related issues

- **Users:** are the front-end consumers who are targeted by the system. They could be members of the general public, businesses, employees, or other government organisations. Users may reside either locally within the country's jurisdiction or beyond (internationally). The main issues illustrated are more concerned with those users located within the country's boundary: Capability—in terms of affordability and knowledge—and a willingness to use the system are key concerns with prospective users.
- **Infrastructure:** is the physical, technical architecture that hosts the system, links and integrates government levels and agencies. This includes the country's telecommunication network that spans the country, the standards adopted, and security measures such as firewalls and public key infrastructure (PKI).

7.1.2 E-government Development Issues and Outcomes

A system development life cycle has four main phases: planning, analysis, design and implementation. Some critical issues for e-government were seen to have wider impacts on particular phases than others. In addition, each phase of the e-government development life cycle is associated with certain outcomes. Figure 7-2 shows the major critical factors in e-government adoption, the extent of their impact on the development life-cycle phases, and the associated outcomes of each phase.

The following is a description of each phase of the development life cycle and its associated issues and outcomes:

- **Planning:** politics and leadership issues heavily influence the inception of the project and the success of the planning phase. Planning to develop and introduce an e-government system must always be backed up and supported by a high degree of leadership interest and commitment. The major outcomes expected at the end of this phase are a national ICT vision and the development of an e-government entity to

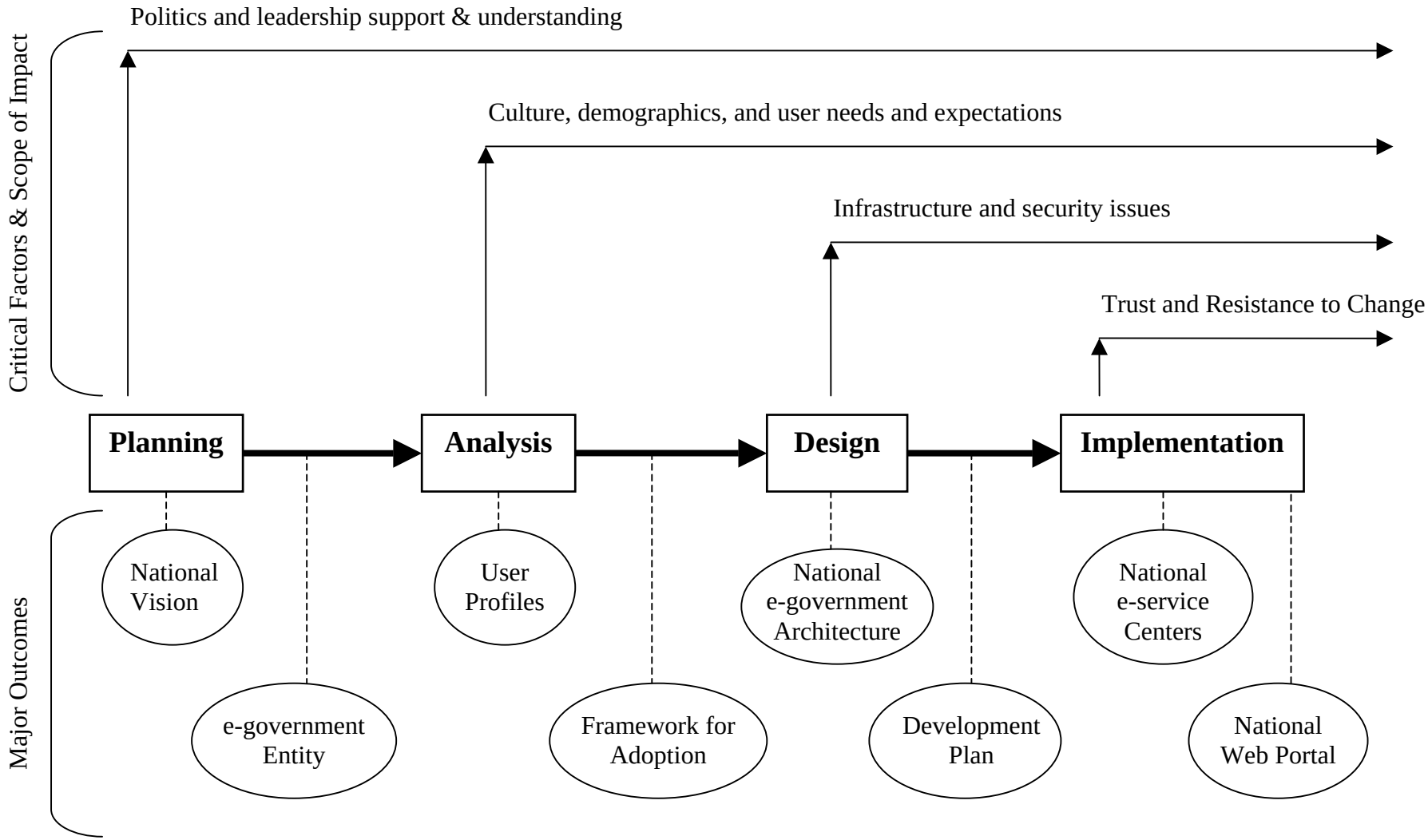


Figure 7-2 E-government system development life cycle issues and outcomes

watch over the e-government project as described earlier.

- **Analysis:** analysing and determining an e-government system's requirements are usually affected by the characteristics, culture, needs, and expectations of users. On the other hand, the analysis stage will typically produce a detailed user profile and a framework for adoption detailing alternatives, solutions and requirements of the e-government system.
- **Design:** the information gathered in the analysis phase will be used to draw a logical design for the e-government system architecture. Inadequate or slow infrastructure and security developments are vital concerns for system designers. This stage is concerned mainly with the level of available infrastructure and security measures, especially when development in this area is taking longer than expected. The expected outputs of this phase are a national e-government architecture and a development plan outlining system artifacts such as interfaces, files, databases, control lists and backup rules.
- **Implementation:** while starting to build the actual system or web portal, concerns about issues that might negatively trigger users' trust and resistance to change might start to float to the surface, given that ICT awareness and education campaigns depend heavily on users practising the e-government system. In other words, governments cannot start to educate and urge people to interact electronically when the e-government system is not yet operational. Theoretical, as well as hands-on practical sessions, must be embedded in awareness campaigns. Both phases must always start and work in parallel. On the other hand, this phase will usually produce a national web portal for direct communication with the system and the establishment of nation-wide e-service physical centres for indirect communication.

7.2 Insights into e-government Adoption in Oman

This section uses the information gathered and concluded from chapters four, five and six to address the essential issues for the adoption and dissemination of e-government in Oman. Chapters five and six aided in uncovering the vital issues and obstacles to the adoption and diffusion of e-government initiatives in Oman as well as describing the characteristics of prospective users. Chapter four provided valuable solutions and lessons for Oman in tackling the barriers defined in chapters five and six.

A profile of e-government users in Oman is illustrated in the next section. In addition, a SWOT analysis derived from chapter five data and from the Murphy (2002) presentation is introduced. Finally and based upon these results, critical factors for the successful development and dissemination of e-government and their implications for Oman are introduced in section 7.2.3.

7.2.1 Profile of e-government Users

Chapter six analysed surveys and interviews undertaken in order to illustrate the characteristics and attitudes of the sample population for the Oman e-government project. The sample was chosen to represent the possible targeted users of e-government. Key factors were selected according to their relationships to the study's central variable, 'willingness to use e-government', and different statistical methods were used to extract the elements of these factors that specifically describe those people willing to use e-government (i.e. prospective e-government users). Table 7-1 summarises the major characteristics of those people most likely to use e-government in Oman.

Table 7-1 Profile of e-government users in Oman

Factor	Feature
Age	20-40
Income	OMR500 and more
Education	Post-secondary
Computer experience	Computer literate
Place of using computers	Home and work or school
Time spent daily on computers	More than 1 hour
Uses of computers	Office and internet applications
Internet experience	Internet literate
Place of using internet	Home and work or school
Time spent daily on internet	More than 1 hour
Cost spent monthly on internet	OMR5 and more
Uses of internet	Information and knowledge search & email
e-commerce experience	e-commerce literate
Searched for products and services online	Yes
Requested information about products and services online	Yes
Willingness to do e-commerce	Yes
Required to do transactions with government	Yes
Number of government transaction annually	5 and more
Knowledge of e-government concept	Yes
Knowledge of e-government initiatives in Oman	Yes
Perception that e-government is helpful to Oman	Yes

People aged between 20 and 40 years old are likely to adopt e-government faster than others. In addition, people with a monthly income of no less than OMR500 and/or a post-secondary educational level are also expected to use e-government. Basically in Oman, people with post-secondary degrees such as a bachelor degree usually earn a monthly income of OMR500 or more. Moreover, a person's computer and internet experiences are very influential regarding their willingness to use e-government. E-government users are likely to be computer and internet literate, spending one hour or

more working on computers and the internet daily, and usually doing this at home, work and/or school.

In addition, people most likely to use e-government in Oman are e-commerce literate, they have at least attempted to search for products and/or services online, and have also requested additional information online about certain goods or services. Moreover, e-government users are likely to be required to do at least five or more transactions with the government annually. The analysis showed that the fewer times a person needs to do business with the government, the less likely they will be willing to use e-government simply because they have no great need for it. Finally, prospective e-government users are likely to be knowledgeable about e-government, aware of e-government initiatives in Oman and above all, have a positive perception that e-government will be helpful to both users and Oman itself.

Having isolated the likely characteristics of e-government users, the Omani government would then need to investigate the segment of the population that possesses these characteristics. At this stage it would be highly advisable to formulate a plan for developing skills and experience in those segments of society most lacking them. The study provided basic insights into this aspect also. As noted in chapter six, for example, IT literacy rates were found to be low among survey participants who represented the likely early adopters of e-government in Oman. Thus, a major emphasis must be placed on improving this facet of the society. In addition, participants in general lack awareness of e-government initiatives in Oman, which stresses the need for better and wider marketing campaigns.

7.2.2 SWOT Analysis

Based upon the information gathered and described in chapter five about the current status of the ICT sector and e-government in Oman, a SWOT analysis was

developed to highlight critical issues to be tackled. The SWOT analysis also provided basic insights for defining critical factors for successful adoption and diffusion. Table 7-2 illustrates the results of the SWOT analysis.

Table 7-2: SWOT analysis results on Oman's ICT sector

Strengths	**Weaknesses**
- Sound economy and good international relations - Stable political system and peaceful society - Small population - Strong leadership support - Strong ICT environment in KOM - Detailed planning, national vision and strategies are in place - Government support to private sector - Strategic geographic location - Majority of population aged 15-65 years – ie. working age - Government commitment to educate and train Omanis - Civil status system supported by smart ID card	- Low internet penetration rate - Incomplete ICT infrastructure - High illiteracy rate - Low level of skilled IT staff and ICT sector companies - Government vision and achievements in ICT are under-marketed - Absence of legislation to support ICT development - Low level of awareness of technology benefits - Slow development within the educational system - Lack of incentives to work in private sector – Omanis prefer working in the public sector - Varied organisational leadership support for ICT development - Low level of ICT application adoption among government organisations - Lack of data and process integration to support e-government - Excessive bureaucratic work processes in government organisations - Internet access and PC prices are relatively high for average citizens
Opportunities	**Threats**
- B2C and B2B outputs are expected to expand swiftly - Support for ICT liberalisation strategy is part of WTO agreement - Government support for privatisation of ICT sector - Vision 2020 adopted ICT to achieve its long-term goals	- Lack of priority to integrate central e-government through all-government steering committee - Government organisations have different rates of e-government adoption - Government organisations work and set plans in isolation from each other - Frequent structural changes within government organisation affect ICT implementation - ICT sector is dependent on public sector purchasing

- Successful e-government projects in neighbouring countries - High adoption rate of mobile telecommunications services - Flexible society open to change	

The table shows that Oman faces many critical issues that need to be addressed. Apart from technical areas, such as lack of proper infrastructure, many of the issues (Weaknesses and Threats) are more cultural and country-specific than technical in nature. Non-technical barriers to the adoption and diffusion of e-government in Oman are central to this research. These obstacles act as inhibitors to adoption and growth in many instances. That is, they negatively influence users in their decision to use the technology and also restrict decision makers from implementing or taking initiatives to adopt e-government (*detailed treatment for such inhibitors to growth is provided in section 7.3*). For example, the absence of e-legislation that governs online activities and the low level of e-government awareness and IT literacy limit the contributions and involvement of users in the e-government project. Subsequently, this will hold back e-government system development and growth that is primarily based upon user needs and involvement. The same issues might also prevent senior private-sector officials from embracing new technologies. This was indicated by interview results, as discussed in Chapter 6, section 6.3.2.

In the next section, the study further examines the findings from the SWOT analysis and the lessons learned from advanced nations in chapter four, section 4.5, to list critical success factors for the development and diffusion of e-government in Oman. If these factors are not addressed, they might also be identified as failure factors.

7.2.3 Critical Success Factors and Their Implications for Oman

Using the information from the SWOT analysis in Table 7-2 and lessons learned

from chapter four, the study now lists the critical factors that can contribute to a successful e-government development and adoption in Oman, as follows:

- **Leadership support and understanding:** This implies short- and long-term commitment and the formation of strong ties with the private sector. Many ICT development plans are now embedded in Oman's five-year development plans as well as Vision 2020. In addition, there is a clear indication that the government aims to encourage the private sector to play a part in ICT development. Despite this, there is a notable gap in leadership support and understanding which must be seen as an inhibitor to growth, as outlined in Section 7.3.2. Moreover, a low emphasis on long-term planning was observed among the Omani leadership (explained in detail in section 7.3.2).
- **The society's e-readiness:** This should be manifested through continuous education, training and awareness campaigns. The ultimate aim behind the IT vision in Oman is to achieve a digital society where e-government is only a subset. The government started adopting computer courses in secondary schools, ICDL programs for employees in government ministries, and began sponsoring internal and external ICT-oriented academic scholarships for government employees and students as described in chapter five, section 5.2.2. In addition, a technology park (KOM) was established with two leading IT colleges to enhance the society's e-readiness and to incubate foreign and local IT investments. Despite these efforts, it should be some time before they start to bear fruit, as illiteracy rates in general are still high and infrastructure is weak, especially in rural areas. However, progress could be accelerated if higher emphasis and funding are given to knowledge and awareness programs, especially as Oman is a small society with a predominantly young population.

- **The country's ICT infrastructure:** OmanTel is required to build a comprehensive network throughout the Sultanate. As described in chapter five, section 5.2.2, government organisations will be connected through an MPLS-based network. Moreover, the Telecommunication Regulatory Authority (TRA) has been established to promote foreign ICT investment and regulate the development of the ICT sector in the country. Nawras is the first to participate as a new mobile operator. ITTS is still reviewing a contract to outsource the network development to OmanTel and this process is taking longer than expected. ICT infrastructure must be completed soon to allow for wider adoption of e-initiatives within both the private and public sectors. The lack of infrastructure has already caused a delay in launching many quick-win projects that were planned for 2004 and 2005.
- **Security measures and laws:** The government is now working collaboratively with a specialist local law firm to produce e-laws for the country that will govern online activities. A complete version of such e-legislation is expected to be ready by the end of 2006. In addition and as described in chapter five, section 5.2.2, ITTS is dedicated through its security strategy to provide participating organisations with the necessary security standards and guidelines. Despite this, people must be informed about the level of security being adopted as well as the advances in producing e-laws for the country. The ultimate aim is to develop secure platforms that will aid in earning the trust of users. Moreover, a delay in completing the required ICT infrastructure will negatively affect the level of security available. Some government departments worked independently from ITTS to develop their own security systems and standards. For example, Muscat Municipality is now applying the BS 7799 security standard, which addresses all security domains from the technical to the environmental and cultural.

- **Inter- and intra-organisational integration:** Collaborating efforts by all government organisations should be emphasised in a citizen-centric approach. ITTS was initially established to plan, manage, coordinate and oversee ICT development efforts for the whole country. As illustrated in section 5.2.2, network and applications strategies were developed by the ITTS to oversee these developments and to ensure proper process integration. Currently in Oman, legacy systems (silos) exist in several ministries and each ministry usually works and develops its infrastructure independently. The presence of such silos will make integration more difficult. The government plans to alleviate this issue by developing a gateway (web portal) up front and a middleware system that can connect both ends (i.e. the legacy systems and web portal). But again, this would need an adequate ICT infrastructure or else implementation will be delayed. In addition, the development of a national web portal in Oman ('Ubar Portal') contract is currently in the process of being awarded to a private developer with an expectation that by the end of 2006 the first phase will be completed. The essence of the portal must be to reflect users' needs and life events rather than physical government departments.

7.3 Insights into Limits to Growth of e-government in Oman

This section uses findings from chapters four, five, six and the SWOT analysis described above to present the major barriers and solutions to e-government development and dissemination in Oman. Chapter four investigated the common barriers and solutions to the uptake of e-government that have confronted many advanced and developing nations around the world. In addition, chapters five and six refined these barriers and investigated their relevance to the Omani situation. Section

7.3.1 presents a list of these obstacles and the recommended remedial actions to be taken as shown by the literature. Next in section 7.3.2, the study presents the major country-specific factors believed to inhibit the adoption, diffusion and growth of e-government initiatives in Oman. These factors were established largely from the results of interviews and supplemented by the SWOT analysis.

7.3.1 Barriers and Counterproductive Actions

The literature was examined for barriers to the uptake of e-government. Table 7-3 below shows the key barriers found along with the proposed actions to be taken. Non-technical issues were examined in depth for their relevance and level of significance to the research questions. It was seen that usability and adoption issues are vital concerns for literally all e-government developers worldwide. Advanced nations as well as developing ones are struggling to expand user adoption of their e-government initiatives.

Table 7-3: Barriers and corrective activities to the uptake of e-government

Barrier	Corrective Activity
Users' lack of IT knowledge, awareness and motivation	- Enlighten users and companies about e-government benefits and risks through continuous marketing in all media - Ensure proper ICT training and education for students and employees - Provide instant identification and incentives
Lack of skilled IT staff	- Address all needed competencies – skills, knowledge and attitudes – through education and training - Provide higher financial and other benefits for ICT-oriented jobs - Promote foreign and local ICT investment
Internet and PC cost	- Reduce access cost and develop public kiosks and e-services centres - Subsidise computers and internet access to schools and other non-profit organisations
Lack of trust and confidence	- Enlighten users and companies about e-government benefits and risks, and preserve users' privacy

	- Ensure successful experiences for users from the beginning and use the power of word of mouth - Counter spam - Develop legislation pertaining to online transactions
Security issues	- Develop and promote security measures such as authentication and PKI - Develop and enforce proper e-legislation - Emphasise accountability and maintain high privacy standards
Culture and language conflict	- Culturally and linguistically translate browsers and applications - Establish e-services centres to act as intermediaries and help to bridge the cultural divide - Ensure proper ICT education and training
Infrastructure and other technical barriers	- Develop a solid comprehensive infrastructure - Select a technology that is neither outdated nor leading-edge - Emphasis on local and reliable maintenance vendors - Seek substantial funding as applicable, and plan for the long run
Lack of leadership commitment and understanding	- Involve stakeholders in the project design and point out the personal benefits of the project to them - Understand and, where possible, meet senior officials' agenda and interests - Conduct regional e-government assessment (i.e. Oman and surrounding countries) as applicable, showing the country's relative position now and in the future
Weak project control	- Ensure continuous leadership support - Use Project Management Software and set explicit criteria for tasks to be started, resumed or discarded - Be prepared to cancel the whole project if necessary - Assign project leaders and managers - Use prototyping and piloting - Think big, start small and scale fast - Emphasise accountability measures
Lack of stakeholder input	- Involve stakeholders in the project design - Motivate stakeholders and educate them in the benefits of the project - Educate developers in the importance of user contribution to the project design
Lack of funding	- Seek leadership support to allocate more funds and resources for the project - Set higher priority for e-government related projects - Adopt less expensive methods such as outsourcing and BOT

Lack of e-laws	- Establish laws that govern online transactions - Survey neighbouring countries for e-law exemplars - Once finalised, develop gap analysis between developed e-laws and the country's existing laws - Enforce e-laws in courts of laws and urge public and private organisations to utilise them
Lack of marketing campaigns	- Plan to justify marketing costs to government officials - Use and develop periodical assessments of e-government achievements and benefits obtained - If leadership understanding is needed, see above for proposed actions

All thirteen barriers were examined for their relevance to the Oman situation and, as indicated in chapter six, section 6.4.1, all of these were seen to be relevant in varying degrees. Specifically, the following five barriers were seen to be the highest in relevance:

- **Users' lack of IT knowledge, awareness and motivation.** E-government is all about users. Therefore, it is crucial to make them aware and knowledgeable about the benefits, available initiatives and how to go about using e- government. However, awareness alone does not guarantee greater willingness or a higher level of usage. Therefore, plans to motivate users by offering incentives and obvious added value over traditional methods of transacting with government must be formulated. In Oman, many educational and awareness programs have been initiated as described in chapter five, section 5.2.2. Time is required to observe the effectiveness of these operations but more initiatives are needed, such as programs to subsidise or lease computer and internet packages to financially disadvantaged people. It will also be effective if SANAD's offices, mentioned in chapter five, section 5.3.1, are utilised further to provide educational and awareness sessions to users. Currently, internet and e-commerce literacy rates in Oman are not high.

However, the computer literacy rate among survey respondents was found to be 81.43 per cent; 56.43 per cent were internet literate and only 48.57 per cent of the respondents were found to be e-commerce literate. These findings are limited by the sample size but still provide a directional input since the sample was chosen to represent those people most likely to use e-government in Oman, as described in chapter three, section 3.3.2.1. The country's strength of commitment to educate citizens will need to be increased to offer additional substantial initiatives to educate and train Omanis in the IT field. More importantly, this should work in parallel with government efforts to develop its e-government initiatives. There must be operational e-government initiatives in place for people to attempt using them. Successful user experiences must also be ensured at this stage (*more about this in section 7.4.2*).

- **Lack of marketing campaigns.** This factor is related also to the first major barrier discussed above. Marketing and awareness-raising campaigns are crucial to inform and educate potential users about current and planned e-government initiatives. Government could benefit from the private sector experience in this regard. In addition, marketing will usually be associated with costs that must be planned, justified and budgeted for. In Oman, this could better be achieved through inter-organisational collaboration. For example, two of the leading media organisations are government owned: Oman Television and Oman Establishment for Press, News, Publications and Advertising (OEPNPA). Marketing costs would be reduced dramatically if a national strategy were set in place allowing government organisations to publish frequent ads through these media for little or no cost. On the other hand, in early 2005, ITTS in collaboration with KOM and OEPNPA launched a quarterly ICT-oriented magazine entitled *Digital Oman*. The magazine is

directed at enhancing the society's e-readiness and awareness about ICT-related projects and issues in Oman and globally. The early efforts were commendable but the published materials were mainly in English, with very few in Arabic. The magazine will be more effective if English materials are translated into Arabic to reach a wider audience.

- **Lack of proper legislation and laws.** People and businesses about to engage in a cyberspace activity must feel secure and protected by the law. In addition, the presence of such legislation that governs and watches over online transactions will promote user trust and higher usage levels. As indicated in chapter five, section 5.2.2, the Omani government is currently undertaking an e-laws project in collaboration with a specialist local law firm. The presence of such laws not only encourages better user participation and confidence, but also promotes the country for foreign ICT investment. More importantly, any delay in producing e-laws for the country might hold back adoption rates. Besides, users must constantly be informed and made aware of the progress and achievements of this project to increase their trust in the government, which again emphasises the importance of marketing. Moreover, organisations must provide users with some sort of acknowledgment at the end of a transaction such as a printable receipt or invoice. In addition, users must be given further communication options like phone numbers or email addresses should they wish to inquire about the status of an online transaction. These needs must also be recognised and enforced by e-laws.
- **Users' lack of trust and confidence.** User trust is one of the ever-recurring dilemmas confronting people and organisations when changes are introduced. Table 7-3 listed several actions that can help to mitigate the effects of this issue, but there is no one cure or solution for lack of trust. In fact, there will always be trust issues

and resistance to change. E-government developers must learn to live with it by planning ahead for awareness and incentives campaigns. In this sense and as indicated earlier, marketing is crucial to spread knowledge about electronic initiatives but should be planned very well. Ensuring proper implementation of programs and successful experiences for users is a step that should precede advertising. In Oman, it was seen that the society in general is prone to forming stereotyped views. Despite OmanTel's many efforts to improve the ICT sector, Omanis in general have formed a poor image of the quality of its services. This has resulted from many bad user experiences and has been emphasised further via word of mouth. Moreover, the majority of the senior officials interviewed from the private sector declared that OmanTel's failure to meet users' expectations about the quality of its ICT services discourages users and inhibits businesses from considering e-solutions. When asked about the main barrier facing e-government development and dissemination in Oman, the majority answered, "OmanTel". This emphasises that successful experiences for users are vital to earn and improve user trust. The chances are very low that users will trust or keep trying any e-solution if it has proved to be faulty from their first few attempts.

- **Poor infrastructure and technologies.** As opposed to the main obstacles already discussed, this barrier is technical in nature but is also affected by some country-specific factors (section 7.3.2). Chapter five shows that the Oman's ICT infrastructure and services are in an early stage of development. Despite this, the Oman government is undertaking a thorough planning and development program for the sector, a change in direction that is understandably taking longer than expected to implement (*more information on this is provided in the next section, 7.3.2*) . Section 5.2.2 in chapter five noted that in addition to other major ICT sector

enhancements, a comprehensive MPLS-based network is soon to be developed and outsourced to OmanTel. More importantly, a set of pioneering e-government projects must be established in parallel instead of waiting for the completion of the telecommunications infrastructure. This is because awareness campaigns will be more effective if they offer practical sessions on some operational e-government initiatives. The initial e-government systems must be based upon open standards to allow for better integration and must cover a variety of mass-usage services to trigger higher usage levels and interest. This will also help to display the advantages of e-government to both its adopters and users. In Oman, many similar initiatives have been launched and others are in the process as illustrated in chapter five, section 5.3.1.

Interestingly, the culture and language barrier was rated among the least relevant to the uptake of e-government in Oman (though it scored above three). This is evident also from the remarks of many interviewees. Many of the senior officials interviewed argued that culture has little effect on e-government adoption in Oman. They believed that Omani citizens are open to change and it would simply require time and marketing to implement e-solutions. That is, marketing is required to inform people about proposed initiatives and time is needed to test them. In addition, despite the perceived notion that high internet and computer levies in Oman might prevent people from adopting e-government, survey respondents ranked this barrier among the lowest in relevance to Oman (although it also scored above three). This means that computer costs and current internet fees are not as problematic as they may seem, and have little effect on e-government adoption and dissemination. This emphasises that the better education and higher income users have, the less effect culture and access costs have on their willingness to use e-government.

7.3.2 Country-specific Factors

One of the essential aims of this study was to identify the country-specific factors that might hinder e-government adoption and development in Oman. This section summarises the major national, or country-specific, barriers to adoption as concluded from interviewees' remarks and the findings from chapter five. These barriers are believed to be limits to growth that play a part in delaying e-government efforts and improvements in the country. The following sections define these obstacles in more detail.

- **Frequent management structural changes.** During the time span of this study, frequent changes occurred in key management positions related to the e-government project. A new Undersecretary of National Economy for Development Affairs was appointed to look after the IT executive committee as illustrated in chapter five, figure 5-5. In addition, a new Undersecretary for Commerce and Industry was appointed to oversee the one-stop-shop project initiated earlier, as described in Chapter five, section 5.3.1. Moreover, a new Head of the ITTS was appointed in late 2005 to carry out the tasks of the technical secretary. These changes occurred in less than three years and have contributed to noticeable setbacks to the e-government project. The new appointees are likely to come with new ideas and methods; they will also require time to digest the existing plans and achievements—all of which will contribute to a delay in e-government development. For example, when the researcher interviewed the previous Undersecretary for Commerce and Industry, he indicated that the one-stop-shop online system would be developed by end of 2004 but by the end of 2005 nothing was ready. This issue is also affected by the following country-specific factor.

- **The habit of short-term planning.** As described in chapter five, section 5.1.4, Oman has adopted five-year, short-term development plans from 1996 until the present. Such short-term planning was justified as necessary to meet the country's basic needs. When the Sultan acceded the throne in 1970, there was only one elementary school and about ten kilometers of paved roads in the whole country. There was a major and urgent need to enhance people's wellbeing and complete Oman's basic infrastructure. The rhythm of short-term planning and the obvious inclination for fast results over more than 30 years is believed to have become entrenched in the minds and attitudes of Oman's leaders. This has caused many senior government officials to seek quick results, either because they are convinced of the benefits of short-term planning or they feel a need to satisfy their superiors with rapid results because they fear job loss and/or a diminished power base. This might be a reason for the frequent personnel changes discussed above, when results have not been achieved quickly enough. Despite the fact that in 1996 Oman initiated the long-term plan 'Vision 2020', the vision has unofficially been discarded since the vision founder (a highly-ranked government official) was dismissed (another management structural change). Vision 2020 still exists officially and many government reports still refer to it, but some officials indicated that many key points were abandoned with little evidence or indication of what has been achieved in relation to it. Most importantly, there is no solid sign that Vision 2020 is backed by strong leadership support.
- **Inadequate official authority of ITTS.** As described in section 7.1.1, an independent e-government entity is required as a building block for any e-government project. The entity must have sufficient authority to contact and enforce standards and plans throughout the government organisations. In Oman, ITTS acts

as an e-government body but it is part of the Ministry of National Economy. It is headed by a general manager who reports to the Undersecretary of National Economy. ITTS's lack of authority and self-government is believed to have contributed to delays and unplanned activities in the e-government project. Many interviewees described how the lack of authority and independence of ITTS inhibits its control and the extent of its capabilities. For example, one government official explained that active government organisations work separately from ITTS simply because they don't feel it has any authority. He added that the head of ITTS does not have the power or authority to make direct contact with other ministers to discuss ITTS plans and strategies. In addition, the Undersecretary of National Economy is not solely available to ITTS and his position is mainly administrative. Currently, it is mainly a bottom-up approach where ITTS meets and sets plans with relevant general managers from other public organisations who in turn try to persuade their superiors. This adds to the timeframe of planned efforts and strategies.

- **E-government is not a high priority at present.** Many government and private-sector officials claimed that e-government will not be achieved unless the country first fulfils its basic needs. This is understandable given the country's need to satisfy the rural population's basic requirements in healthcare, education and transport. It will always be a question of whether to fund an e-government related project or build a new hospital or school in a remote area where people need it the most. Moreover, interviewees from PDO, the giant oil company in Oman, indicated that oil in Oman is expected to be depleted in 20 years. This notion is believed to have influenced the attitude of Oman's leaders towards prioritising projects and long-term planning, especially now that the future is vague in terms of financial resources. Funding issues will soon be a problem as more evidence becomes available that

Oman's oil resources are dwindling rapidly. Nonetheless, aiming to gain higher priority for the e-government project must always be a key concern for ITTS. This could be achieved by seeking better leadership understanding and support for the short-and long-term benefits, which will result in more generous funding. On the other hand, calculating the project Return on Investment (ROI) and justifying the associated costs will be difficult given the short-term mindset prevalent among Oman's leadership. This issue along with those previously mentioned has contributed to the following factor also.

- **E-government is not urgently needed.** Despite the strong leadership support and understanding of the need to improve the ICT sector and build a digital society, indications are that there is no urgent need perceived for a complete e-government system. Government officials believe that the e-government project must take time to be implemented and that fast implementation will not do the country much good. They claim that the e-government project and the time it takes will help the government to discover critical aspects of the society, such as computer and internet literacy rates, which will not be revealed otherwise. It will also help to direct attention to reforming and integrating government processes for better efficiency. Rapid development is seen to be infeasible at the moment as usage levels will be very low. This is obviously the case, as only a minority of the population would benefit from e-government - since in 2003 only about six per cent of all Omanis had post-secondary education (and were therefore likely to have knowledge about computers and the internet). Moreover, the study found that even within this small segment of society, IT literacy was not extensive. In this regard, time is needed to prepare society and government leaders for such a paradigm shift and also for a successful assessment and re-engineering of government processes. Additionally,

the government cannot afford to postpone IT-based projects that would help to improve the society's e-readiness. In other words, the e-government project will serve other related aims as well, such as educating the general public and the "old school" leadership on the benefits of IT and ultimately achieving a digital society.

- **Stereotyping and the power of word of mouth.** Omani citizens are seen to be prone to stereotyping, and in such a small society as Oman word of mouth has proven to be very influential. This has been witnessed by a local Omani company, Oman Investment and Finance Company (OIFC), that has responsibility to calculate, issue and collect residents' utilities fees on behalf of some government ministries. The company now accepts payments through ATMs and internet banking. Some interviewees indicated that OIFC failed to provide credible proof to clients about their electricity and water usage levels, and in many instances the company also miscalculated the amount due. Interview participants wondered how users who were obviously disillusioned about the company's physical channel would be willing to use or even try electronic means. This has caused citizens in general to develop a bad image of the company's services and credibility, an image widely reinforced by word of mouth. Besides, and despite OmanTel's many efforts to improve the ICT sector, Omanis in general have also developed a poor image of the quality of OmanTel's services. This is a result of many bad experiences for users and has been emphasised further via word of mouth. The majority of senior officials interviewed from the private sector declared that OmanTel's failure to meet user expectations in the quality of its ICT services discourages users and inhibits businesses from considering e-solutions. When asked about the main barrier towards e-government development and dissemination in Oman, the majority answered, "OmanTel". Monopoly is the only reason OIFC and OmanTel are still in business, but this will

soon change as the country implements more ICT liberalisation initiatives. These cases illustrate the importance of managing the tendency of potential users to form and spread generalised views.

7.4 Roadmap: The Way Forward

Many critical issues have been highlighted earlier that have an effect on e-government adoption and dissemination in Oman, most of which influence people's willingness to use e-government. This section introduces a forward-looking view of the key factors surrounding and shaping Omani users' willingness to use e-government. A detailed framework for adoption illustrating the key factors and issues around e-government willingness is highlighted. In addition, this section presents valuable implications for the Oman e-government project which have been learned from the experience of advanced nations (chapter four).

7.4.1 Framework to Adoption

This section synthesizes research results into a framework to e-government adoption: this was the ultimate aim of the study. The early phases of the study were devoted to a review of the e-government literature in order to identify observed barriers to the uptake and diffusion of projects based on this technology and possible solutions to these barriers. In much of the literature, these solutions are classified as e-commerce/e-government *success factors.* As noted, this review has focused on experiences in Australia and other Western countries such as the UK and USA, who are reasonably advanced in their use of online technologies. A detailed treatment of the literature review, in addition to insights gathered from surveys and interviews, is encapsulated in the *Causal-Loop Diagram (CLD)* presented in Figure 7-3.

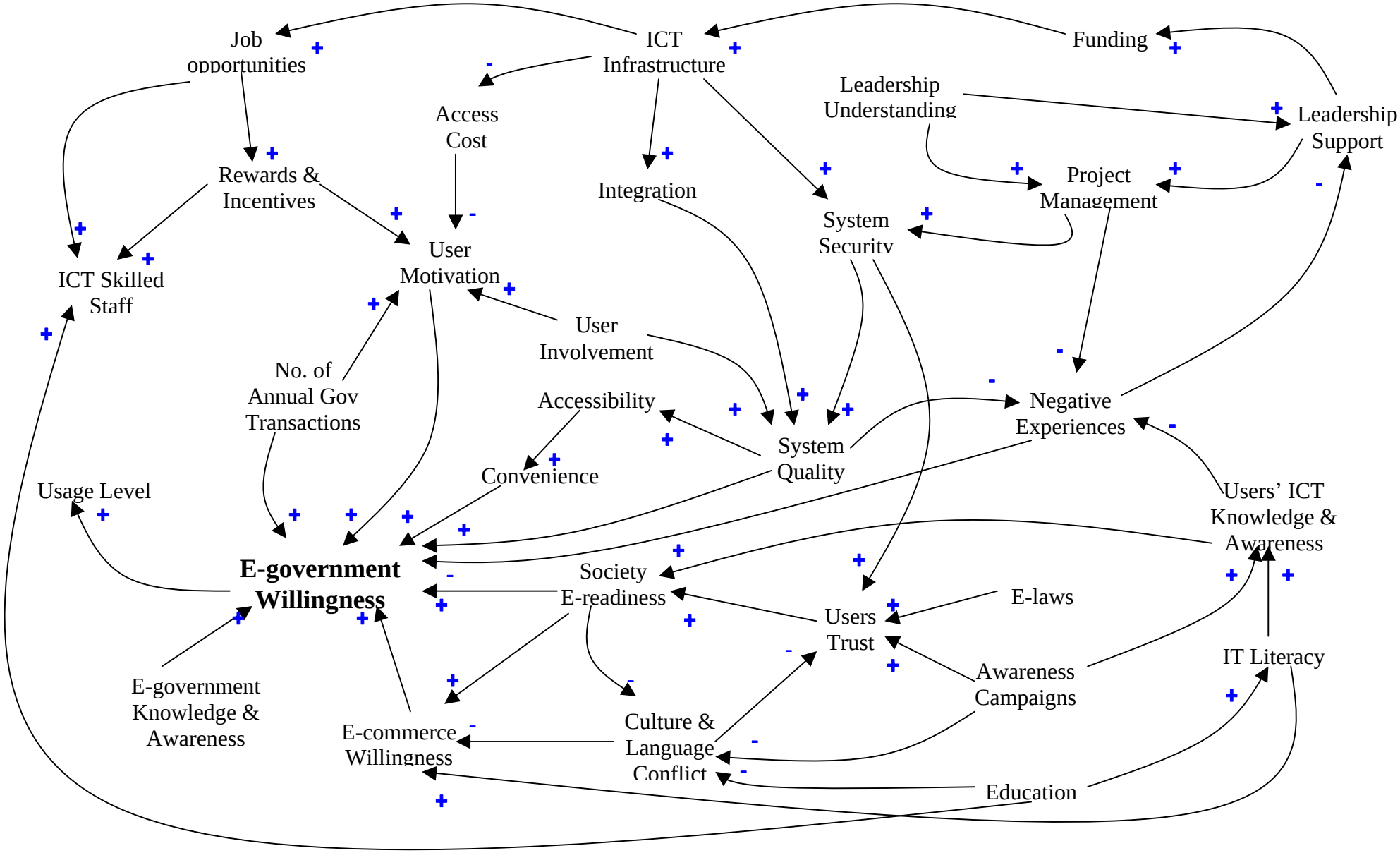


Figure 7-3: E-government framework for adoption

This diagram is an abstract model of the e-government adoption framework, identified earlier as one of the key outputs of this research. CLDs are one of the two basic representation formalisms used within system dynamics modeling, a knowledge representation approach that has been in use for over 40 years (Forrester 1961) and one that has been used to very good effect in recent years – partly because of the emergence of some excellent computer-based modeling and simulation tools (for examples, see Vennix 1996). A major advantage of system dynamics (particularly when models are represented in CLD form) is that extremely complex relationships, feedback loops, recursive dependencies and interrelated sub-problems may be conveyed using a single, very simple cause-and-effect construct. For example, in Figure 7-3 it can be seen that good *system security* will lead to increased levels of both *system quality* and *user trust;* that a lack of *leadership support* will have a negative impact on *funding* and *project management* quality; and that these respectively may well lead to poorer *ICT infrastructure* and an increase in users' *negative experiences*. Poor *ICT infrastructure*, though, will lead to low *system security* and *integration* levels between organisations and this, in turn, will result in poor *system quality* and lower levels of *user trust* – widely recognised as one of the most critical factors for e-commerce success (see, for example, Turban et al. 2002). The above example clearly demonstrates the complexity of this particular problem domain and the folly of applying many of the simple cause-effect style heuristics promoted in much of the e-commerce literature without due attention to total problem context.

Moreover, conclusions reached here comply with some of the well established technology adoption theories such as the Theory of Reasoned Actions (TRA) developed by Ajzen and Fishbein (1980), and the Technology Acceptance Model (TAM) developed by Davis (1986). According to Ajzen and Fishbein (1980), TRA

hypothesizes that people's behavior is determined by their intentions which are determined by two basic determinants:

- Personal factor: a person's positive or negative evaluation of performing the particular behavior of interest (illustrated by the Negative Experiences factor in Figure 7.3)
- Social factor: a person's perception of social pressure to perform or not to perform the behavior of interest (illustrated by Society E-readiness and Culture and Language Conflict factors in the framework and evident from the stereotyping and power of the word-of-mouth country-specific factor discussed earlier).

TAM on the other hand theorizes that technology acceptance behaviors are highly influenced by two basic beliefs (Davis, 1989):

- Perceived usefulness: the extent to which a person believes that using the technology will improve his/her job performance (illustrated by the Convenience factor in the framework).
- Perceived ease-of-use: the extent to which a person expects the technology to be effortless (illustrated by the System Quality and Accessibility factors in the framework).

The framework consists of 30 major factors that collaboratively affect users' willingness to use e-government (the central variable of the study). It is also clear that higher willingness to use e-government will trigger better usage levels. The essence of this framework was to depict the key factors surrounding users' willingness to use e-government in Oman. Detailed treatments of the other issues governing these factors are beyond the scope of the study, although brief descriptions were provided in the previous chapters. The following is a description of each major factor illustrated in Figure 7-3, sorted in alphabetical order:

- **Access Cost:** this describes the associated costs, such as internet and computer levies, to users attempting to utilise the e-government system.
- **Accessibility:** this illustrates with how much ease all types of people, including the disabled, can use the e-government system.
- **Awareness Campaigns:** this involves all programs initiated to enhance people' awareness of the benefits and initiatives of e-government.
- **Convenience:** this describes the comprehensiveness and broad features of the e-government system that offer a wide array of online services and information, making it worthy of usage.
- **Culture & Language Conflict**: this defines the degree of influence people's language, norms and values have on exploring and adopting new technology.
- **Education:** this specifies the level of education attained by people.
- **E-commerce Willingness:** this states the degree of users' determination and enthusiasm to undertake e-commerce activities.
- **E-government Knowledge & Awareness:** this indicates the degree of user knowledge and understanding of what e-government is all about, and their awareness of e-government initiatives in Oman.
- **E-government Willingness:** this states the degree of user determination and enthusiasm to use the e-government system.
- **E-laws:** this describes the availability and the level of enforcement for legislation that watches over online activities.
- **Funding:** this deals with the task of allocating financial resources to fulfil the needs of the e-government project.
- **IT Literacy:** this describes users' literacy in terms of using computers, browsing the internet and performing e-commerce activities.

- **Job Opportunities:** this highlights the number of jobs being created as a result of the e-government project.
- **ICT Infrastructure:** this includes the country's telecommunications network, standards and available services.
- **ICT Skilled Staff:** this indicates the total number of ICT-skilled human resources available for the country to help in the successful development of the e-government project.
- **Integration:** this represents inter- and intra-organisational links that aim for enhanced collaboration, efficiency and effectiveness of the e-government project.
- **Leadership Understanding:** this represents leadership knowledge about the e-government project, short- and long-term benefits, associated costs and critical requirements.
- **Leadership Support:** this indicates the degree of leadership commitment to the successful development and completion of the e-government project.
- **Negative Experiences:** this specifies the number of faulty attempts and poor experiences encountered by users of the e-government system.
- **No. of Annual Gov(ernment) Transactions:** this corresponds to the number of times a person is required or expected to transact with the government yearly.
- **Project Management:** this includes all processes, tasks, people and organisations involved in managing the e-government project.
- **Rewards and Incentives:** this corresponds to government rewards and incentive schemes to promote higher public interest in e-government including usage, ICT jobs and awareness campaigns.
- **Society E-readiness:** this indicates the level of ICT capability, understanding, affordability and trust among the population.

- **System Quality:** this indicates how easy to use, well-developed, user-centric and comprehensive the e-government system is.
- **System Security:** this represents the level of solidity, security measures and standards being incorporated into the e-government system.
- **Usage Level:** this specifies the extent to which the e-government system is used.
- **Users' ICT Knowledge & Awareness:** this indicates users' alertness and ability to utilise basic ICT-related programs and systems.
- **Users' Involvement:** this describes the task of seeking feedback and involving the users in the design of the e-government system.
- **Users' Motivation:** this describes user motivation to participate in and use the e-government system.
- **Users' Trust:** this involves people's beliefs, norms and values that govern their decisions in embracing new technologies.

7.4.2 Lessons Learned and Implications for Oman

Nine key lessons have been learned from the experiences of advanced nations in e-government as described in chapter four. This section outlines the implications of these lessons for Oman. It also aims to raise and address key issues for adopting the lessons in the Oman situation. The following paragraphs describe each lesson and its related consequences for Oman.

Lesson One: *Develop a national e-government vision and ensure high leadership support, commitment and understanding.* In Oman, a national vision has been set with clear indication of leadership support. The Sultan has expressed the importance of education since his accession in 1970 with his famous statement, "We'll educate even if only under the shade of trees". His improvements and modernisation

programs have helped to enhance the country's wellbeing in a short time. He has also recently declared the importance of improving the ICT sector, ICT-based economy and having a digital society in Oman, and has urged ministers, businesses and all citizens to work collaboratively towards these aims. This makes one wonder what will happen after him? And can such improvements be expected to continue after his lifetime?

According to the Basic Law of Oman (Ministry of Information – Oman, 2005a) the succession to the throne must be given to an adult Muslim male from the royal family (descendant of Sayyed Turki bin Said bin Sultan) with Omani Muslim parents. The royal family has three days to decide who will succeed when the position of Sultan becomes vacant. If the royal family does not reach agreement on a successor, the defence council must confirm the appointment of the person nominated by the Sultan in his letter to the royal family council. The government shall carry on its business normally until the new Sultan is chosen and starts to exercise his authority. Thus, the successor will come from the royal family. The royal family members, especially those descendants of Sayyed Turki bin Said bin Sultan, are well known in Oman for their continuous support of and successful contributions to the Sultan's policies and development programs, and most of them hold senior advisory positions in the cabinet. It is therefore likely that the improvement programs and impetus to modernise the country will persist after the Sultan's passing, and that the support for developing a digital society in Oman will be inherited. It is only the country-specific factors outlined above that are likely to hold back gradual improvements to the e-government project.

Lesson Two: *Define user profiles, needs and expectations to provide information and services accordingly.* This study provided a directional input to the Oman e-government project on the basic characteristics of people most likely to use e-government in Oman (section 7.2.1). IT literacy is found to be low, which stresses the

need for more investment and advancements in the education sector (*an implication about the education factor is presented in lesson four*). Furthermore, survey participants emphasised a need for less complicated services, fewer queues and shorter access times. Government ministries in Oman must start planning for process re-engineering. The vast majority of Oman society who are not yet e-ready would appreciate better services and reduced time and effort needed to perform transactions with the government. These steps will aid future integration activities also, either internally within organisations themselves, or externally. On the other hand, users' expectations about what e-government in Oman could offer them are low. This is really an advantage that could be utilised by e-government adopters to trigger better user motivation and trust. Offering cutting-edge e-government initiatives at a time when user expectations are low might drastically impress users and help to restore their trust and counter the low image they hold of an agency. This was evident when Muscat Municipality launched its SMS parking system described in chapter five, section 5.3.1, where the uptake and word-of-mouth response was most encouraging. Moreover, as users become more IT literate and willing to use e-government, their expectations may become higher and more demanding. In this event the government must aim to contain users' expectations and keep them informed about what is happening behind the scenes. It was apparent that many ministries and agencies including ITTS held conservative views on what information to reveal and what to keep confidential. This might negatively impact user trust and expectations. A case in point was a recent press conference with the president of OmanTel who, reluctant to give away a competitive advantage, refused to reveal details about the company‘s plans for 2006, thereby greatly disappointing stockholders and the general public alike (Alrahbi and Alqadoi, 2006).

Lesson Three: *Develop e-government applications around audience rather than simulating physical government agencies.* This emphasises the importance of involving users in the design stage of the e-government system as well as designing the system around users' needs and life events. This, however, it is not always an easy thing to achieve and requires early planning. Australia, for example, is leading in terms of e-government implementation but its national web portal (www.australia.gov.au) has a slow adoption rate (Teicher and Dow, 2002). This is due to the fact that the initial efforts were directed to developing systems for individual government agencies and services. Only later did the Australian government create a national web portal offering hyperlinks to all e-government initiatives. In addition, marketing efforts for e-government initiatives in Australia were scattered around individual initiatives with little focus on the web portal. It would be better if marketing campaigns were directed towards the web portal instead. In Oman, a national web portal, 'Ubar Portal', is planned for development by the end of 2006. Design and implementation would most likely follow the Australian model, whereby a series of hyperlinks to the available websites and online services of various ministries will be displayed, as well as general information about the country. In this sense, marketing will be most effective if directed towards this single point of entry—making it easy for users to remember one address for all government services instead of a number of links. In addition, as more and more government services are launched, users can easily be kept informed through the portal which, hopefully, will also offer email capabilities to users.

Lesson Four: *Increase user ICT awareness, skills and knowledge through marketing and education.* Users must have the financial and technical capability to utilise e-government and be aware of the services available online. The Omani government is investing widely in education with plans and initiatives to embed ICT in

the education process. Higher-education institutions in Oman are providing computer literacy courses for their students. Officials argue that such courses must be given to students in schools and that computer literacy should be a prerequisite for admission to colleges and universities. Currently, the government is offering a basic computer course to students at level 11. However, the annual number of secondary school graduates exceeds the number absorbed by higher-education institutions in Oman. This has forced the government to embrace a range of vocational training programs as part of the Omanisation policy, to qualify students to work in lower-skilled jobs and minimise unemployment rates. Introducing a number of basic ICT-related courses in schools will equip future secondary school graduates with the necessary skills to help them find better jobs and higher-education opportunities. Additionally, this will help to alleviate the employment and training burden on the government.

Lesson Five: *Maintain extreme security and privacy measures to uphold and gain users' trust.* As indicated earlier in section 7.3.2, Omani society is known for its tendency to form stereotypes and dependence on word of mouth. Government and business organisations must strive to use these factors in their favour. Failure to contain these issues would result in losing one's good image and have a negative effect on user trust. As noted earlier, OIFC and OmanTel are now struggling to enhance their image in an attempt to regain user trust. Government ministries in Oman must first seek to gain user trust on their physical channel, especially concerning issues of security and privacy. No matter how secure and solid the system is, adoption rates will be low if users are dissatisfied with the organisation's normal face-to-face means of approach. This signifies the importance of process re-engineering, with an emphasis on more convenient transaction processing and shorter queues.

Lesson Six: *Ensure successful experiences to first-time users through one- and two-way communication and interactions.* This is related also to the Omani society tendency to stereotype and place high reliance on word of mouth reports. Ensuring proper implementation of programs and successful experiences for users are steps that should precede advertising. Ministries must endeavour to develop robust, efficient and effective systems that meet users' needs and, if possible, exceed their expectations. Successful user experiences are vital to earn and improve users' trust. The chances are very low that users will trust or keep trying any e-solution if it has shown to be faulty in their first few attempts. In addition, such failures are likely to become known to a large portion of the society via word of mouth, which will degrade the organisation's image. Accessibility and convenience in time and location are critical to ensure enhanced user experiences but other fringe benefits—such as monetary incentives (i.e. fewer fees)—are also essential to gain higher adoption rates. In addition, developing and maintaining user-friendly interfaces and reliable and error-free programs require skilled resources and ample funding. Government staff must be able to handle users' inquiries and concerns about the system both electronically (two-way communication) and in person, and adequate human and financial resources must be allocated to the system.

Lesson Seven: *Adopt a multi-channel approach to minimise users' impression of social injustice.* A highly-ranked government official indicated that there will always be a digital divide in Oman and that the government must attend to all users' needs and capabilities. E-government will be directed towards those who can afford both financially and technically to use it. Other means and channels must be open to disadvantaged people such as those in rural areas (i.e. suffering from access divide), or people with no computer literacy. In this sense and as noted earlier in chapter five, section 5.3.1, the SANAD offices currently being developed throughout the country by

the Ministry of Manpower in cooperation with a local IT company, Bahwan CyberTek, will certainly play a part in bridging the gap. Currently these offices only utilise the Ministry of Manpower labour smart card forms, a system that accelerates the process of issuing labour cards to expatriates in Oman. There are plans for these offices to offer residents the option of conducting other transactions with the government such as paying bills and fees, and contacting municipal services. Internet cafés and service bureaus can also be utilised in the same way to provide people with other options for transacting with the government. The main objective must be to be fair to all levels of society.

Lesson Eight: *Plan to collaborate and integrate public services internally and externally, horizontally and vertically.* Integration across and within government ministries is not an easy thing to achieve. Australia, for example, is leading in terms of e-government implementation but has a low rate of integrating the services horizontally and vertically (Teicher and Dow, 2002). This source indicated that Australia's national web portal (www.australia.gov.au) offers hyperlinks to all available e-government systems but is lacking real back-end integration. In addition, marketing efforts have been spread over many individual e-government initiatives with little focus on this national portal. As noted in section 7.2.3, Oman is also expected to face hurdles in its integration process, as some ministries contain legacy systems supported by IT departments and IT maintenance companies unwilling to bargain. The role of intermediaries is becoming increasingly important (ESCAP, 2004, 23) and is believed to offer a solution to this problem. Thus, ITTS is planning to adopt a middleware system that links such silos to the national web portal and/or the ministry e-government interface. It is crucial to note here that such plans for integration must be supported by a

robust infrastructure, sufficient funding and continuous leadership understanding and support.

Lesson Nine: *Assess e-government infrastructure, projects, and know-how regularly to promote and guide improvements.* Continuous assessment of the e-government project must be carried out. Initiatives must be tested against users' needs and their feedback sought. Leadership support must be retained throughout the project lifecycle to ensure adequate funding. In the USA, citizen satisfaction assessment programs promoted higher adoption among government agencies (Freed, 2004). In Oman, ITTS must seek to evaluate e-government plans and achievements versus user needs and capacity, and ensure that improvements are planned and carried out accordingly. In addition, ITTS must calculate Return on Investment for available e-government initiatives, and produce periodical reports on top performers. This would help to retain or increase leadership support and encourage organisations, especially less proactive ones, to adopt e-government plans—the more so if the reports highlight the financial rewards and benefits to be gained.

7.5 Summary

This chapter combined findings from chapters four, five and six to produce the study's major findings. Major barriers and solutions to the uptake of e-government in Oman have been presented along with the critical factors for success in e-government development. A comprehensive framework for e-government/e-commerce adoption has been provided to guide the implementation of e-government in Oman, and finally, a set of recommendations in the form of lessons and implications for Oman has been generated.

The final chapter (Chapter eight) concludes the study by addressing the research questions, outcomes and limitations. It also outlines several suggestions for future work.

8.0 Conclusion

This project attempted to add significant inputs to knowledge by shedding light on culture and other country or region-specific factors in e-government development and dissemination. It has conducted a case study on Oman in order to define the cultural drivers and country-specific variables that might obstruct the introduction of an e-government system - in the Arab world in general and Oman in particular. In addition, it aimed to examine the awareness, eagerness and readiness of the Omani people to use e-government, report on impediments and propose solutions. The research objectives and outcomes are believed to assist Oman and any other country with similar characteristics across key variables in the uptake and planning for e-government.

This chapter provides a wrap-up of this thesis by addressing the extent to which the study has met its research questions and outcomes, and defines its limitations. It begins with identifying the answers to the research questions noted earlier in chapter three section 3.2. Then, it discuses the major outcomes of the study as outlined in chapter one section 1.3. Subsequently, the study's limitations are highlighted and, finally, recommendations for future work are provided.

8.1 Research Questions

The study aimed to address the research questions as outlined in chapter three section 3.2. This section outlines the solutions to these questions as concluded from the previous chapters.

Question One: *What are the major barriers to the uptake of e-government in Oman? And what are the possible solutions (if any)?* The literature was reviewed and

advanced nations' e-government experiences were examined to define the major obstacles to the adoption and dissemination of e-government and the proposed solutions. The findings of this step are summarized in table 7-3 in chapter seven. A case study that involved surveys and interviews was carried out in Oman to test the relevance of these barriers and solutions to the Omani situation and dig for more country-specific factors. Chapter six section 6.4 analysed the gathered surveys and interviews' data and chapter seven section 7.3.1 pinpointed the major barriers and their implications to Oman.

In brief, the single most significant impediment to the adoption and dissemination of e-government in Oman is an internal digital divide. This was observed not only among citizens and regions but even between government ministries. ICT literacy among citizens is currently low, Muscat City is more advanced in terms of basic infrastructure, and several ministries lack leadership ICT support and understandings. In addition, currently only about six per cent of the Omani population has post secondary education (Census Administration, 2004). As a result, several key officials from the private sector indicated that adopting advanced ICT initiatives in Oman is unfeasible in the meantime. The education statistic is understandable given that Oman's renaissance began only in 1970 with just one elementary school and three kilometers of asphalted roads (Ministry of Information – Oman, 2006). Besides, the first post secondary institution to offer bachelor level education (Sultan Qaboos University) was established in 1986, and the Ministry of Higher Education was established later in 1994 to plan and coordinate higher education programs offered throughout the country (Ministry of Information – Oman, 2006a).

The government continuous education initiatives helped to improve the sector and reduce the illiteracy rate among the general public from 31.8 per cent in year 1993 to only 17.8 per cent in 2003 (Census Administration, 2004), as shown in Table 5-1 in chapter five. The same table can also be used to provide rough estimates of the percentage of the population to that might be expected to hold secondary level education or above after a further 10 years should the current education development efforts remain the same. For example, in year 1993, 5.5 per cent of the general population had secondary school education where in 2003, the figure improved to 17.9 per cent (an increase rate of 3.26). On this basis, we might expect that by year 2013 this figure might reach around 58 per cent. The same with post secondary education levels: these have increased by 2.19 since 1993 and might be expected to reach something like 13 per cent by 2013. In short, more than two thirds of the population (71.35 per cent) will most likely be capable of using the e-government system by 2013 (i.e. holding secondary education level or above where computer courses are currently offered). There are also promising signs that this figure could be improved further. Additional education initiatives have been introduced lately that were not available during the previous decade such as the advanced technology park (KOM) with two leading IT colleges, the establishment of three more private universities around the country, the proliferation in number of schools and private colleges and institutes around the country, and the government and private sector collaborative efforts to sponsor larger number of students to study abroad.

Furthermore and since the government only commenced heavily implementing ICT development and training programs throughout the country in year 2000, it may not be long way until Oman starts bearing the fruits of these initiatives. All interviewees indicated that Oman will need about 10 to 15 years until e-government

becomes widely adopted and implemented (which coincides with the previous education expectation). Nevertheless, it is apparent that, despite the current modernization efforts within the education sector in Oman, an even higher emphasis and priority on education and ICT related training would lead to e-government project benefits being realized within a much shorter timeframe. Moreover, the government should aim to alleviate the effects of cultural or country-specific factors (described next) and offer incentives to potential e-government users.

Question Two: *Are there any cultural, national or country-specific factors that might obstruct the adoption and dissemination of e-government in Oman?* The Oman case study through surveys and interviews uncovered several country-specific issues in Oman that acted as inhibitors to e-government growth. Chapter seven section 7.3.2 highlighted these and described their causes and effects.

Interestingly, the majority of survey participants and interviewees did not perceive culture as problematic as it seemed. This is perhaps due to the fact that people define and observe culture differently. Some interviewees showed defensive attitudes when asked if Omani culture is likely to seriously affect e-government adoption, where others were adamant that in Oman (and the Arab world in general), cultural factors are definitely important. The study found several country-specific factors that are viewed as cultural by some interviewees. The most eminent issue of these is perhaps the habit (or norm) of short-term planning. The urge to achieve quick results to address the country's basic needs is believed to have also produced other country-specific factors such as frequent personnel changes in key e-government related positions. This habit has further been reinforced after an official declaration that oil reserves are about to deplete significantly within the country. Interviewees from PDO, the giant oil company in Oman, indicated that funding and priority issues

will soon be evident as more reliable information become available on how much oil is left. The obsession that oil, the current major natural resource in Oman, will soon be depleted could probably discourage leadership from planning for the long run - simply because the future is currently vague. It also stresses the need for fast results before the country runs out of oil.

On the other hand, the study found that it is also essential to contain and address people's expectations in Oman. Omanis are found to be prone to stereotyping and rely heavily on word of mouth when making decisions. Building negative stereotypes has inhibited users from seeing the expected potential and positive results of several ICT projects. They tend only to focus on established images and strengthen these through word of mouth. It is probably for this reason that marketing initiatives are seen cautious and conservative. Some interviewed government officials who are directly involved in setting e-government plans refused to reveal information pertaining to certain current and future e-government activities and projects. Possibly, they feared announcing planned tasks that may later could substantially be altered or simply discarded, and which might be regarded by users and/or higher leadership as failure or incompetence. This notion was observed in OAB when introducing its smart ATM card system. OAB's leadership had high expectations about the system, but when users' adoption appeared to be low initially, they started to oppose and divert the blame towards lower management.

This emphasizes that leadership must be educated regarding the long term benefits of e-government. Whether this will occur in the future is debatable but there are encouraging signs: e.g. leadership support for programs such as adopting computer courses in secondary schools, and introducing ICDL programs for government employees. Besides, a number of ministries that used to be fairly inactive

in terms of e-government deployment have begun to embrace advanced ICT initiatives. For example, the Ministry of Housing, Electricity and Water launched an advance geographic information system (GIS) recently that embeds demographic and other related information into digital maps of the Oman regions (Oman, 2006).

Question Three: *What lessons may be learned for the Omani situation from the Australian and other advanced nations' experiences with e-government?* Advanced nations such as Australia, UK and USA were investigated for lessons of e-government development and diffusion and findings are presented in chapter four section 4.5. Chapter seven described further the implications of these lessons for Oman in section 7.4.2.

Nine key lessons have been abstracted from advanced e-government experiences around the world. Leadership support, and understanding and commitment to projects are perhaps the most essential e-government prerequisites. It is essential that government intention(s) behind adopting an e-government system should be evaluated. Some governments view ICT and e-government as a tool to project a good image about the country and to attract foreign investments (Poon, 2002). In this case, fast implementations are usually sought with little attention paid to users' needs and e-government take-up. For example, in Dubai, an advanced e-government system was developed rapidly with little attention being paid to addressing users' needs and capabilities right from the beginning. Recently, some government officials in Dubai admitted that e-government failed to click with public (Milne [2006], Milne [2006a]). Therefore, satisfying users' needs and matching their capacities must be the primary desired end of an e-government system, right from the inception of the project – and should guide project development at every step.

On the other hand, users' low expectations resulting from past negative experiences (or simply a lack of ICT knowledge and awareness) might be used to achieve a significant positive impression if robust and reliable e-government initiatives are introduced. In general, people with negative stereotypes about any agency will most likely expect little of much use from such a body. This could be countered by providing impressive, preferably unique initiatives that addresses users' needs and exceed their expectations. In addition, institutions must always seek to provide their users with successful, convenient and easy-to-use systems. This must be sought not only in the online systems, but in physical channels also. People, unsatisfied with physical means of dealing with an organization will probably not be well-disposed to experimenting with online methods. This was witnessed with OIFC, as several interviewees indicated that if the company failed to provide sound physical service to customers for nearly two decades, how would it be able to offer better services online?

The country's telecommunication infrastructure is very crucial also to the success of e-government. In Oman, the government must accelerate the process of building a nation-wide comprehensive telecommunication infrastructure that will aid the country in attracting foreign investment and tackling future threats (such as oil reserves depletion). Many crucial development projects heavily depend on the country's core network: especially within different regions - such as SANAD's regional offices, described earlier in chapter five section 5.3.1.

8.2 Research Outcomes

As described in chapter one section 1.3, the study aimed to produce several outputs in order to address the critical factors for the adoption and diffusion of e-

government initiatives in Oman. The following lists the major outputs and the extent to which the study has met each of them.

Framework for adoption: a comprehensive framework for e-government/e-commerce adoption was provided in chapter seven section 7.4.2, utilizing findings from chapters four, five and six. The framework defined critical issues for e-government adoption, and their causes and impacts in a casual-loop diagram. The central factor of the framework is users' 'e-government willingness'. The better the society e-readiness, users' motivation, convenience features of the e-government system, users' knowledge and awareness of e-government, the higher e-government adoption and willingness among users is likely to be. In addition, experiences with e-government or any other ICT project are likely to affect users' willingness to use e-government. As noted earlier, negative and positive experiences could further be reinforced or wiped out through word of mouth depending on how successful the system is.

The number of government transaction that users' are required to do annually is also likely to influence their willingness to use e-government - especially in the short term. People who are required to do more transactions annually will most certainly feel a higher need for enhanced means of communication and interaction with government. In this respect, the government might well consider offering special online service packages to heavy transaction volume users. In addition, these online channels should be convenient to users and provide obvious advantages over conventional methods. For example, if an online facility allows users to pay only electricity and phone bills online but they have to use normal means to pay for water and the internet, then perhaps they will prefer to do everything by conventional means.

The framework also shows that ICT infrastructure plays a major role in determining the development of the e-government system. It controls other related factors - such as horizontal and vertical integration among agencies, system security and access cost. These factors positively relate to e-government system quality. In this respect, and as mentioned earlier, a delay in completing the country's telecommunication infrastructure will most likely influence the quality and expected outcomes of the e-government system, and thus might result in high levels of negative experiences for users.

Profile of e-government users in Oman: A highly ranked interviewee from the private sector indicated that in Oman we should first know if people are capable of using e-government and, if yes, then we should seek to see if they are willing to use it. In this respect, surveys were distributed to a sample population that was chosen to represent those people most likely capable of utilising e-government in Oman. The selection criteria employed were education and income. That is, a person must have had a certain level of education to be able to use computers and perform basic internet activities, and/or have access to a reasonable level of monthly income to afford costs associated - such as for buying computers and accessing the internet. Chapter six examined survey returns to define the basic characteristics of the sample population that showed positive attitudes towards e-government usage (willingness), and chapter seven section 7.2.1 illustrated their profile.

Currently, people most likely to use e-government in Oman are expected to be between 20 and 40 years old with a post secondary level of education and an income level of OMR500 or more. Arguably, the age and education factors could change in the future as more education initiatives that involve ICT training are offered within lower education levels (i.e. elementary and primary). An encouraging indication was

observed when a leading private school recently launched an IT based educational system that enables young school children at the elementary level to interact electronically with teachers and download lessons' materials online (Alwatan, 2006). In addition, older people (above 40 years old) in the future will be better off in terms of IT literacy and skills as more IT based training and education is carried out throughout the country (and as today's youth age).

The e-government users' profile developed in this study may well provide insights to ITTS into key demographic issues that require attention to promote higher e-government take-up. For example, it is now clear that users in Oman that do not fall within the specified profile will most likely not use e-government - either because they simply can not or are not willing. Accordingly, ITTS will be able to distinguish population groups that require ICT training and awareness campaigns, and offer development and corrective activities appropriately. More broadly, e-government officials from other countries that share basic characteristics with Oman (such as the GCC) could utilize this profile as a general signal of crucial factors and features of people most likely to use e-government in their countries.

Barriers to the uptake of e-government in Oman: a questionnaire instrument was developed using the data gathered from the literature to test the relevance of the barriers found from the largely Western-centric literature to the Omani situation. Chapter six section 6.4 analyzed the gathered data and chapter seven section 7.3.1 described the barriers investigated and their relevance to Oman.

A total of 13 barriers were investigated that, collectively, contributed to a significant digital divide among people, regions and public organizations as described earlier. Corrective activity options gathered from the literature were recommended for each obstacle. User related issues, such as their level of IT literacy, trust, and

awareness and knowledge about e-government, were prevalent. Leadership understanding about the expected effects of these issues is imperative (along with their support for efficient corrective activities).

A SWOT analysis was performed to highlight the current critical issues that can either impede e-government adoption (Weaknesses and Threats), or facilitate its growth (Strengths and Opportunities). In brief, the government initiated a set of pioneering programs to tackle or exploit these issues - such as establishing KOM, offering IT based education scholarships to increase the level of local IT skilled workers, and making use of leadership support to initiate major education development plans and campaigns. The study used the SWOT results to highlight a group of critical e-government success factors.

Perhaps the most prominent success factor of all is leadership support and understanding. There is a clear indication that ICT support exists among leadership in Oman but their ICT understanding varies significantly. This caused different ministries to set diverse prioritization levels for e-government related projects (i.e. active vs. passive). For example, ROP is considered leading in terms of e-government and ICT deployment, with its Civil Status system identified as the best e-government application project in the Arab world in an information society world summit held in Tunisia in 2005 (Times of Oman, [2005] and Alwatan [2005]). On the other hand, some other government ministries do not even have a web site yet (such as the Ministry of Heritage and Culture).

Country-specific inhibitors to e-government growth: Interviews with highly-ranked officials in Oman were conducted to elaborate and extend upon the findings of the surveys. A SWOT analysis was performed as noted above upon the data illustrated in chapter five about Oman's plans and achievements in the ICT

sector. The findings from interviews and the SWOT analysis were used to conclude several country-specific factors that acted as inhibitors to e-government growth. Chapter seven section 7.3.2 described these factors in detail.

These barriers acted as inhibitors to e-government growth by limiting leadership support and delaying e-government development programs. For example, ITTS, the government body responsible for looking after e-government in Oman, currently lacks adequate official authority to implement e-government plans and activities, and to achieve coordination across public organizations. This might be a result of the existing digital divide between ministries that hinders ITTS from adopting a single e-government development approach and coordinating input from various organizations. Another vital issue they face is just how they speed up IT developments in certain organizations and slow down others.

Moreover, the fact that e-government is not of high priority nor urgently needed at present limits and delays development despite the current level of leadership support. Leadership must understand that the country should quickly carry on with development projects that have broad future value such as e-government before oil depletes. Financial and budgeting experts must properly allocate funds and prioritize development projects bearing in mind the urgent need to secure a prosperous future at the expense of any current needless tasks.

Lessons learned from advanced nations and implications for Oman: advanced nations in terms of e-government development and adoption such as Australia, UK and USA were examined for valuable lessons. Chapter four section 4.5 presented nine key lessons (as noted earlier in section 8.1) for successful planning and development of e-government. These lessons have further been examined for implications for Oman and presented in chapter seven section 7.4.2.

In addition to the nine key lessons learned from advanced nations discussed earlier in research question three, five key e-government development building blocks were identified along with their related critical issues. Figure 7-1 in chapter seven depicts the importance of an e-government entity in the proper planning and development of a quality e-government system. The entity acts as a hub, looks after and coordinates other building blocks; leadership, users, e-government system, telecommunication network. Each of the building blocks has certain related issues. For example, with leadership, issues like leadership support and developing a national ICT vision are of concern. Most significantly, the e-government system must seek to enhance its usability not only by developing a user-friendly online interface but by further offering suitable delivery channels to users (such as public kiosks, public centers and internet cafés). The idea is to give users options to choose from and accommodate disadvantaged users who cannot use the online system. This will aid in overcoming any social injustice impressions among citizens.

Critical issues surrounding the e-government system development life cycle, as well as expected outputs of each phase, have been illustrated in Figure 7-2 in chapter seven. The figure is believed to assist e-government developers to plan for and focus on critical issues that are likely to emerge during certain development stages. It also defines the anticipated outcomes from each development phase. For example, culture and users' demographics are likely to be of concern to developers during the analysis phase because, ultimately, detailed user profiles and a framework for adoption must be produced. Similarly, it is unlikely that security standards and procedures, for example, will be of use to developers during the planning phase, where the ultimate aim is to develop a national vision and establish an e-government entity.

8.3 Research Limitations

Conclusions reached throughout this thesis are limited by the following factors:

- The sample size for surveys was 140, representing only those people with good education and income. Other segments were omitted because they are least likely to benefit from any e-initiatives in Oman especially in the short term.
- The sample investigated is from Muscat capital and therefore conclusions reached might not relate to people from outside that city.
- Secondary school survey respondents are biased heavily in favour of males over females (40 to 4). Therefore, the conclusions reached in this sub-set of the sample might not correspond fully to female secondary school views.
- Inadvertently, the majority of the employees chosen in either the public or private sector were male. This could be due to the fact that the arranged contacts were males and/or the percentage of female workers in general is lower than male workers in Oman. The same situation is likely among university students also; the majority of participants were male students.

In spite of the previous limitations, the study's findings are believed to be applicable to other Arab countries that share basic national and demographic characteristics with Oman such as the GCC countries as explained in chapter three section 3.5. It should also be stressed that the established criteria (education and income) are only concerned with direct e-government users that interact directly with the online system with no intermediaries such as service bureaus. The education criterion will likely remain as a pre-requisite for direct e-government users since IT courses are now offered in secondary schools, and the income factor will also probably persist for as long as subsidized initiatives takes to come to light. Although

there are promising signs indicating that computer courses and IT related education are becoming an integral part of the curriculums of some private elementary schools in Oman, current indications are that government schools are unlikely to follow in this direction - at least, not in the short-term.

8.4 Future Work

Gender based analysis in the adoption and dissemination of e-government is beyond the scope of this study. Some remarks gathered from interviews indicated there may well be potential effects of gender on users' willingness to adopt e-government. For example, an official from the government declared that female users are more likely to use e-government in Oman because it is more convenient for them. He justifies this on the basis of the conservative nature of women in Oman, who are generally required by tradition not to go out alone and usually spend more time at home. Future work may investigate the possible relationship of gender and willingness to use e-government/e-commerce in Oman and/or the Arab countries.

On the other hand, a major trend on planning and adopting mobile based services and applications within developing nations was observed (see for example, Abanumy and Mayhew [2005], Garg [2005], Hossan et al [2005], Santos [2005]). In addition, as noted in chapter five section 5.2.3, mobile services are very popular among people in Oman, and because of this, an official from the private sector indicated that decision makers in Oman currently intend to focus more on mobile based applications such as m-commerce and m-government. The SMS based parking system adopted by Muscat Municipality could be viewed as an early initiative in this direction (described in chapter five section 5.3.1). Future work could test the validity of this study's findings on m-government and m-commerce initiatives.

Finally, the results reached in this study are believed to assist Oman and other countries with similar characteristics across key variables in e-government planning and take-up. Hence, comparative studies could be performed to match the findings of this study with other developing countries. By conducting a similar study on different countries that perhaps share basic characteristics with Oman, the findings reached might be compared to the results of this study and affirm or extend its results.

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Questionnaire (Arabic Version)

مقدمة

توجد الإنترنت الآن في كل مكان. حاليا هناك الكثير من الاستخدامات للإنترنت التي تفيد الشخص في عمله اليومي. الحكومة الإلكترونية هي إحدى أهم منجزات الإنترنت. هي دعوه من الحكومة المنفذة إلى كل المؤسسات والمواطنين والجهات الخاصة بالتواصل والتعامل إلكترونيا. نظام الحكومة الإلكترونية يساعد في تطوير كفاءة الخدمات الحكومية وتقليل وقت وقيمة إنجاز المعاملات. ببساطه، الحكومة الإلكترونية تمكن المواطن من إجراء جميع أو بعض المعاملات الحكومية من المنزل باستخدام الحاسوب والإنترنت.

من جهة أخرى، يواجه مشروع الحكومة الالكترونية الكثير من العقبات والعوائق التي يمكن أن تحد من جدواه. يهدف هذا البحث إلى دراسة تأثير العوامل الثقافية والديموغرافية في تطوير واستخدام نظام الحكومة الإلكترونية في سلطنة عمان. سيحاول البحث إبداء الحلول للمشاكل الحالية أو المستقبلية التي قد تواجه مشروع الحكومة الإلكترونية في السلطنة.

ولكي نتمكن من عمل ذلك، سيقوم الباحث بتوزيع استبيان على العديد من المواطنين العمانيين كشخصكم الكريم اللذين يمكن أن يقدموا معلومات مهمة عن عوامل نجاح الحكومة الإلكترونية في سلطنة عمان. نود لذلك أن ندعوكم لتكونوا جزءا من هذه الدراسة والتي ستمكن الباحث من التعريف بالعوامل الرئيسة في تطوير وفهم بوادر الحكومة الإلكترونية في عمان.

إجاباتكم ستكون سريه للغاية ولن يتم مشاركتها مع أي جهة خارجية. وسيتم استخدامها لفروض بحثيه فقط.

الحكومة الإلكترونية في سلطنة عمان
عوامل التطبيق والانتشار

هذا الاستبيان هو جزء من عمل بحثي باسم "العوامل الهامة لتطبيق ونشر الحكومة الإلكترونية في سلطنة عمان". يهدف هذا البحث إلى دراسة وتحليل أثر العوامل الثقافية العمانية بشكل خاص والعربية بشكل عام في تطوير ونشر أسس الحكومة الإلكترونية في السلطنة.

معلومات عامة

1- العمر؟

- أقل من 20 سنه - 20-30 - 31-40 - أكثر من 40 سنه.

2-المستوى التعليمي:

- إعدادية عامة - ثانوية عامة - جامعه (بكالوريوس/ ليسانس).
- أخرى (*الرجاء التحديد*) .....

3-المهنة / المسمى الوظيفي:

.....

(أن كنت لا تعمل، الرجاء الذهاب إلى السؤال رقم 5)

4-الدخل الشهري:

- أقل من 200 ريال - بين 200 إلى 500 ريال
- بين 500 إلى 900 ريال - أكثر من 900 ريال

الدراية باستخدام الحاسب الآلي

5- هل سبق لك العمل على جهاز الحاسب الآلي (الكمبيوتر)؟

- نعم - لا *(الرجاء الذهاب إلى سؤال 16)*

6- أين تستخدم الحاسب الآلي؟ *(يمكنك اختيار أكثر من خيار)*

- البيت - العمل - المدرسة
- أخرى *(الرجاء التحديد)*.....

7- ما هو معدل وقت استخدامك للكمبيوتر يوميا؟

- أقل من ساعة - بين ساعة إلى ثلاث ساعات
- بين أربع إلى عشر ساعات - أكثر من عشر ساعات يوميا.

8- فيما تستخدم الكمبيوتر عادة؟ *(يمكنك اختيار أكثر من خيار)*

- برامج الإنترنت "البريد الإلكتروني، المتصفح، التحدث (chatting).

- برامج المكتب "معالج البيانات، قواعد البيانات، الحسابات.
- للألعاب والتسلي ه .
- أخرى *(الـــــــرجاء الـــــــتحديد).....*

.....

الدراية باستخدام "الانترنت"

9- هل سبق لك استخدام الإنترنت؟

- نعم - لا *(الرجاء الذهاب إلى سؤال 16)*

10- ما هو معدل وقت استخدامك اليومي للإنترنت؟

- أقل من ساعة واحده - بين ساعة إلى ثلاث ساعات
- بين ثلاث إلى ست ساعات - أكثر من ست ساعات يوميا

11- أين تستخدم الإنترنت عادة؟

- البيت - العمل - مقهى الإنترنت
- المدرسة

12- ما هو معدل مصاريف استخدامك للإنترنت شهريا؟

- أقل من خمسة ريالات - بين خمسة إلى عشرة ريالات
- بين عشرة إلى خمسة وعشرون ريال - أكثر من خمسة وعشرون ريال

13- **ما هي استخداماتك للإنترنت؟** ***(يمكنك اختيار أكثر من خيار واحد)***

- البريد الإلكتروني - ال تسليه والتحدث (chatting).
- البحث عن المعلومات والمعرفة.
- أخرى *(الـــــــرجاء الـــــــتحديد).....*

.....

الدراية بالتجارة الإلكترونية

14- هل سبق لك أن؟

- تسوقت في الإنترنت [نعم] [لا]
- استخدمت الإنترنت للبحث عن خدمات/أو منتجات [نعـــم] [لا]
- قمت بطلب معلومات أضافية عن منتجات أو خدمات [نعم] [لا]
- قمت بدفع فواتير شهريه (كهرباء، هاتف ... الخ) عن طريق إلكتروني (كال إنترنت، هاتف ...الخ)
  [نعم] [لا]
- قمت بأي عمل تجاري آخر عن طريق الإنترنت [نعـــم] [لا]

15- **إذا أجبت بنعم بأحد الأسئلة أعلاه، الرجاء وصف التجربة.**

هل لديك الرغبة لعمل المزيد من الأعمال إلكترونيا؟

- نعم - لا *(إذا لا، لماذا؟)*

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معلومات عن الخدمات العامة

16-هل ستقوم بإجراء معا مله مع أحد الجهات الحكومية (إصدار بطاقة شخصيه، دفع فواتير، تجديد جواز،الخ ....) في المستقبل القريب؟

- نعم - لا *(الرجاء الذهاب الى السؤال رقم 20)*

1 7 - كم عدد المرات سنويا التي تقوم فيها بإجراء معامله مع جهات حكومية؟

- أقل من خمس مرات - بين خمس إلى عشر مرات.
- بين عشر إلى عشرون مره - أكثر من عشرون مره

18- كيف تقوم بإجراء المعاملات الحكومية عادة؟

- وجها لوجه (بحضورك الشخصي الى الجهة الحكومية).
- باستخدام وكيل أو مساعد أو أحد مكاتب تخليص المعاملات.
- باستخدام الهاتف.
- أخرى *(الرجاء التحديد).....*

.....

19- الرجاء وصف تجاربك في انجاز المعاملات مع الجهات الحكومية. ما هي المشاكل التي واجهتها؟

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الدراية بالحكومة الإلكترونية

20- هل سبق لك سمعت بمصطلح الحكومة الإلكترونية قبل هذه المرة؟

- نعم - لا

إذا كانت الاجابه بنعم الرجاء التحديد ***أين؟ وكيف؟***

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21- الرجاء إبداء رأيك فيما يسمى بالحكومة الإلكترونية في عمان.

أ-هل ستكون مفيدة لسلطنة عمان؟

- نعم - لا *(إذا لا، لماذا؟)*

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ب-هل ترغب باستخدام الحكومة الإلكترونية في عمان؟

- نعم - لا *(إذا لا، لماذا؟)*

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ج- هل تعلم بوجود أي من مشاريع الحكومة الإلكترونية في السلطنة؟
- نعم - لا
إذا نعم، الرجاء الوصف والتحديد؟

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عوائق الحكومة الإلكترونية

22- يواجه مشروع الحكومة الإلكترونية الكثير من العوائق عند التطبيق و البناء عالميا. الجدول التالي يبين قائمه بأهم هذه العوائق التي تمت مواجهتها من قبل العديد من دول العالم. الرجاء تحديد درجة تناسب وتقارب هذه العوائق مع مشروع الحكومة الإلكترونية في سلطنة عمان.

العوائق	تناسب قليل				تناسب كبير
قلة التوعية والتشجيع	1	2	3	4	5
قلة المعرفة باستخدام الكمبيوتر والإنترنت	1	2	3	4	5
قلة الموظفين الملمين بتقنية المعلومات	1	2	3	4	5
السعر المالي للإنترنت والحواسيب	1	2	3	4	5
قلة الأمن المتوفرة بالإنترنت	1	2	3	4	5
انعدام ثقة المستخدم	1	2	3	4	5
انعدام ثقة المستخدم	1	2	3	4	5
مشاكل مختصة باللغة وثقافة البلد	1	2	3	4	5
عدم تكامل البنية التحتية والتقنية المناسبة	1	2	3	4	5
قلة المعرفة والتصميم من قبل الجهات المختصة	1	2	3	4	5
سوء إدارة للمشروع	1	2	3	4	5
عدم مشاركة المستخدمين في تطوير النظام	1	2	3	4	5
قلة الأموال المخصصة	1	2	3	4	5
عدم توفر القوانين والإجراءات الامنيه المختصة بالعمليات التجارية في الإنترنت	1	2	3	4	5
قلة حملات التوعية بأهمية الحكومة الإلكترونية	1	2	3	4	5

23- إذا كان هناك عوائق لم تذكر في الجدول السابق الرجاء تحديها وشرح أهميتها فيما يختص بمشروع عمان لتطبيق نظام الحكومة الإلكترونية.

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شكرا لحسن تعاونكم.

Appendix A—Survey Template

Questionnaire (English Version)

Dear (Sir/Madam)

The Internet is now ubiquitous. Nowadays, there are many Internet applications, which have been developed to facilitate our day-to-day activities. Electronic government (E-government) is one of the vital applications of the Internet. It is an invitation from the government to all its institutions, citizens and businesses to communicate electronically. It assists governments in cutting red tape and enhancing the efficiency and effectiveness of their public services. On the other hand, many barriers must be faced in the development and diffusion of E-government.

This project aims to investigate the effects of the cultural and other country/region-specific factors on the development and diffusion of E-government in Oman. It seeks to define potential cultural, national and other country/region variables that might hinder the development or usage of E-government in Oman. It will aim to address barriers to E-government using Australia and other western countries experiences to establish benchmarks.

In order to achieve the desired goals, the researcher is conducting a survey with officials and citizens such as yourself, who are in a position to provide valuable information on attitudes to E-government and related data. We would like to invite you to be part of this study, which will help the researcher to identify the Critical Factors in the Adoption and Diffusion of E-government Initiatives in Oman. This study has major significance to the Oman government in general and Omani people in particular. It will assist Oman in the uptake and planning for E-government. It will explore the impacts of the national/cultural issues in Oman on E-government, report on impediments and propose solutions. In addition, this project will be committed to address and resolve societal needs in relation to IT and help to smooth the introduction of E-government in Oman.

I assure you all responses will be confidential. Return of the survey form will constitute your consent to participate in the study.

Thank you in anticipation of your involvement.

Yours sincerely,
Hafedh AlShihi

Any queries about your participation in this project may be directed to the researcher (Name: Hafedh AlShihi ph. + 61 2 9685 36272). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MC, Melbourne, 8001 (telephone no: 03-9688 4710).

Oman's E-government Project: Factors Influencing Adoption and Diffusion

This survey is part of a study into *Critical Factors In The Adoption And Diffusion Of Electronic Government (E-Government) Initiatives In Oman.* It aims to investigate the effects of the cultural and other factors on the development and diffusion of E-government in Oman.

Background Information

[1] What is your age?

a. Less than 20 b. 20 – 30 c. 31 – 40 d. Above 40

[2] What level of education have you completed?

a. Primary school b. Secondary school c. Bachelor degree
d. Others *please specify*
……

[3] What is your occupation?

……...(*If not working, please go to question 5*)

[4] What is your ***monthly*** income range?

a. Less then 200 R.O. b. Between 200 R.O. and 500 R.O.
c. Between 500 R.O. and 900 R.O. d. More then 900 R.O.

Computer Experience

[5] Have you ever worked on a computer?

a. Yes b. No *(if 'No', please go to question 16*)

[6] Where do you use a computer ***usually***? *Choose more then one option if applicable*

a. Home b. Work c. School
d. Others *Please specify*
……..

[7] How often do you use a computer ***daily***?

a. Less then 1 hour b. Between 1 and 3 hours
c. Between 4 and 10 hours d. More then 10 hours

[8] What do you use a computer for ***mainly***? *Choose more then one option if applicable.*

a. Internet applications (e.g. Email, Chat, Browser, …etc)
b. Office applications (e.g. Word processors, Spreadsheets, Databases, …etc)
c. Games and entertainment
d. Others *Please specify*
……....

Internet Experience

[9] Have you ever used the Internet?
a. Yes b. No *(if 'No', please go to question 16*)

[10] How often you use the Internet ***daily***?
a. Less then 1 hour b. Between 1 and 3 hours
c. Between 3 and 6 hours d. More then 6 hours daily

[11] Where do you use the Internet ***mainly***?
a. Home b. Work c. Internet café d. School

[12] Estimate how much you spend ***monthly*** to use the Internet?
a. Less then 5 R.O. b. Between 5 and 10 R.O.
c. Between 10 and 25 R.O. d. More then 25 R.O.

[13] What do you use the Internet ***mainly*** for? *Choose more then one option if applicable*
a. Email
b. Chatting and entertainment
c. Information and knowledge search
d. Others *Please specify*
……...……

E-Commerce Experience

[14] Have you ever:

a.	Shopped on the Internet	Yes	No
b.	Used the internet to find information about services and products	Yes	No
c.	Paid for products or services in the Internet	Yes	No
d.	Requested further information about certain products or services	Yes	No
e.	Paid utilities' bills using any electronic medium like the Internet	Yes	No
f.	Conducted any other E-commerce transactions in the Internet	Yes	No

[15] If you've answered yes to one or more of the above questions, are you willing to do more?
a. Yes b. No
If 'No', why?
……
……
……
……...

Public Services Information

[16] Will you be required to perform any transactions with any public organization (e.g. obtaining a drivers license, a passport etc. or paying a bill of some sort) in the near future?
a. Yes b. No *(if 'No', please go to question 20*)

[17] How many times ***annually*** do you conduct transactions with the public sector?

a. Less then 5 times b. Between 5 and 10
c. Between 10 and 20 d. More then 20 times

[18] How do you conduct the transactions with the public sector ***mainly***? *Choose more then one option if applicable*

a. Face to face b. Using an agent c. By phone
d. Others *Please specify*
……

[19] Please describe your experience(s) so far in conducting transactions with the public sector. What are the problems you've encountered (if any)?

……
……
……
……
……

E-government Experience

[20] Have you ever heard of E-government before this time?

a. Yes b. No

If yes, please describe where and how?

……
……
……
……
……

[21] Please describe your opinion about E-government in Oman:

a. Is it going to be helpful to Oman?

a. Yes b. No

If 'No', why?

……
……
……
……
……

b. Are you willing to use it?

a. Yes b. No

If 'No', why?

……
……
……
……
……

Are you aware of any E-government initiatives in Oman?

a. Yes b. No

If 'Yes', please describe and state your opinion about them.
……
……
……

Barriers to E-government

[22] Many barriers must be faced in the development and diffusion of any E-government project worldwide. The following table list most of the barriers encountered by many nations around the globe. Please circle the degree to which you see these barriers are relevant to Oman's situation.

Barrier	Low Relevance				High Relevance
Lack of users' IT knowledge, awareness and motivation	**1**	**2**	**3**	**4**	**5**
Lack of skilled IT staff	**1**	**2**	**3**	**4**	**5**
Internet and computer cost	**1**	**2**	**3**	**4**	**5**
Lack of users' trust and confidence	**1**	**2**	**3**	**4**	**5**
Lack of security	**1**	**2**	**3**	**4**	**5**
Culture and language conflict	**1**	**2**	**3**	**4**	**5**
Poor Infrastructure and technologies	**1**	**2**	**3**	**4**	**5**
Lack of top officials commitment and understanding	**1**	**2**	**3**	**4**	**5**
Bad project control and management	**1**	**2**	**3**	**4**	**5**
Lack of users inputs and feedbacks	**1**	**2**	**3**	**4**	**5**
Lack of Funding	**1**	**2**	**3**	**4**	**5**
Lack of proper legislation and laws	**1**	**2**	**3**	**4**	**5**
Lack of marketing campaigns	**1**	**2**	**3**	**4**	**5**

[23] If you feel there are other barriers, which were not listed in the above table and are pertinent to Oman's case, please feel free to list them and indicate why you see them relevant?

……
……
……
……
……

Thank you so much for your time and assistance

Appendix B—Interview Templates

Draft Letter to Interview Participants

PO Box 615
PC 132 AlKhoud
Oman

January 24, 2004

Dear Sir / Madam,

The internet is now ubiquitous. Nowadays, there are many internet applications, which have been developed to facilitate our day-to-day activities. Electronic government (e-government) is one of the vital applications of the internet. It is an invitation from the government adopting it to all its institutions, citizens and businesses to communicate electronically. It assists governments in cutting red tape and enhancing the efficiency and effectiveness of their public services. On the other hand, many barriers must be faced in the development and diffusion of e-government.

This project aims to investigate the effects of the cultural and other country/region-specific factors on the development and diffusion of e-government in Oman. It seeks to define potential cultural, national and other country/region variables that might hinder the development or usage of e-government in Oman. It will aim to address barriers to e-government in Oman using Australian and other western countries' experiences in the same domain to establish benchmarks.

In order to achieve the desired goals, the researcher is conducting interviews with officials and citizens such as yourself, who are in a position to provide valuable information on attitudes to e-government and related data. We would like to invite you to be part of this study, which will help the researcher to identify the *Critical Factors in the Adoption and Diffusion of E-government Initiatives in Oman.* This study has major significance to the Oman government in general and Omani people in particular. It will assist Oman in the uptake and planning for e-government. It will explore the impacts of the national/cultural issues in Oman on e-government, report on impediments and propose solutions. In addition, this project will be committed to address and resolve societal needs in relation to IT and help to smooth the introduction of e-government in Oman.

I assure you all responses will be confidential. **Could I ask you please to complete the attached Consent Form prior to our interview.**

Thank you in anticipation of your involvement

Yours sincerely,
Mr. Hafedh AlShihi

Consent Form for Interview Participants

CERTIFICATION BY PARTICIPANT

I**,**

of

certify that I am at least 18 years old and that I am voluntarily giving my consent to provide information for the above described project entitled: **Critical Factors in the Adoption and Diffusion of E-government Initiatives in Oman,** being conducted at Victoria University of Technology, Melbourne, Australia by: Mr. Hafedh AlShihi.

I certify that the objectives of the experiment, together with any risks to me associated with the procedures listed hereunder to be carried out in the project, have been fully explained to me and that I freely consent to participate in this project.

Procedures:
Structured interview conducted by Mr. Hafedh AlShihi. The interview will be taped or notes taken according to the participant's preference in order to record information accurately. The information gathered will be kept confidential along with the identity of the participant. Serious measures will be taken to insure the anonymity and confidentiality of the participant and the information collected.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this experiment at any time and that this withdrawal will not jeopardize me in any way.

I have been informed that the information I provide will be kept confidential.

Signed: **….**

Witness other than the experimenter: **Date: ….....**

….

Any queries about your participation in this project may be directed to the researcher (Name: Mr. Hafedh AlShihi, ph. +968 9207075). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MC, Melbourne, 8001 (telephone no: +613-9688 4710).

Questions to Officials from the Government Sector

The following is the general framework for the set of questions asked during interviews

E-government Plans and Strategy

- The e-government strategy was unveiled on May 7th 2003; when is it going to be implemented?
- What are the different phases planned for strategy implementation? And what are the planned duration and cost of each one?
- Where do you see Oman and e-government after 5 years from today?
- E-government advantages are so obvious, are there any drawbacks for e-government in Oman? If yes, please clarify?

E-government Project Management and Control

- Who is in charge of the planning and supervision of the e-government project(s) in Oman?
- How much budget is/will be allocated for the entire e-government project in Oman?
- Why is it that some government institutions are more active than others in the adoption and dissemination of e-government in Oman?
- What is your assessment of what has been done so far in the area of e-government in Oman? Are we moving slowly? Why is that?

Barriers to E-government

- Effective legislation and laws pertaining to e-commerce and any online activities are crucial to any internet business application. Is there any law(s) established in Oman to govern online activities? If yes, please clarify. If not, when will we see such laws in Oman?
- Many Omani citizens are computer illiterate. What options are planned for them to use e-government?
- Do you think citizens' income and the current internet fares can be a major obstacle to the dissemination of any IT project in Oman such as e-government or e-commerce? If yes, how do you think it can be solved?
- How are you planning to cope with the little awareness and motivation among some Omanis to utilise the new e-government initiatives?
- If the e-government system in Oman is to offer e-payment solutions, what payment options are planned to be offered?
- It is expected that fear and trust issues arise when performing financial transactions on the internet. How you plan to cope with this challenge to the adoption of e-government in Oman?
- Do you believe education and training are the sole solutions for the uptake of e-government in Oman? If yes, how? If no, why? What other solutions are planned?
- What are the major barriers faced or expected to be faced in the uptake of e-government in Oman? And how you plan on coping with them?

Questions to Participants from the Private Sector

The following is the general framework for the set of questions asked during interviews

Information and Communication Technology (ICT) Overview:

- What is your organisation's vision and strategy in utilising the ICT sector and the internet to improve its day-to-day activities?
- How do you perceive ICT's potential for public and private establishments in Oman in general?
- What is your assessment of the progress of the ICT sector in Oman?
- What major ICT project(s) have you implemented recently in your organisation?

E-commerce and E-government Overview:

- Do you have any plans, strategy, and / or vision for implementing e-commerce in Oman? If yes, what? If no, why?
- What is your assessment and opinion of the new national IT initiative named "e-government"?
- How do you see e-government's potential for your organisation?
- Does your organisation have any vision or strategy to exploit e-government initiatives in the near or distant future? If yes, what? If no, why?
- What are the major barriers you expect to the uptake of e-government in Oman? And what are the solutions that might be adopted in this case?

Barriers to ICT, E-government and E-commerce Projects in Oman:

- It is anticipated that only customers with good education and awareness about ICT skills will be using any IT systems. Do you see this as a barrier to any new IT project in your organisation?
- How do you plan to deal with computer-illiterate customers? What is their option in this case?
- Do you think customers' income and internet cost can be a major obstacle to the dissemination of any IT project in Oman such as e-government or e-commerce? Why is that? And how do you think it can be solved?
- It is expected that fear and trust issues arise when performing financial transactions on the internet. How do you plan to cope with this challenge for the adoption of internet banking or any other e-solution in your organisation?
- Effective legislation and laws pertaining to e-commerce and online activities are crucial to any internet business models or applications. Is there any law(s) established in Oman to govern online activities? If yes, please clarify. If not, how would you deal with any adverse online incidents?
- It is well known that not all Omanis obtain credit cards and not all those who do will wish to use them online. Do you see this as a barrier to any e-solution in Oman? And how it can be solved?
- What barriers have you faced or to you expect to face in the implementation / uptake of any e-project you have undertaken?
- Do you believe education and training are the sole solutions for the uptake of any e-system in Oman? If yes, how? If no, why? What other solutions are planned?

Appendix C—Survey Analysis Tables

SPSS Frequency Tables

Q1. AGE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less then 20	42	30.0	30.0	30.0
	20 - 30	69	49.3	49.3	79.3
	31 - 40	23	16.4	16.4	95.7
	Above 40	6	4.3	4.3	100.0
	Total	140	100.0	100.0	

Q2. EDUCATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Secondary	44	31.4	31.4	31.4
	Bachelor	66	47.1	47.1	78.6
	Others	30	21.4	21.4	100.0
	Total	140	100.0	100.0	

Q3. OCCUPATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	2.1	2.1	2.1
	Accountant	2	1.4	1.4	3.6
	Admin Researcher	1	.7	.7	4.3
	Analyst	1	.7	.7	5.0
	Assistant Lecturer	1	.7	.7	5.7
	Assistant Professor	6	4.3	4.3	10.0
	Banker	1	.7	.7	10.7
	Civil Engineer	1	.7	.7	11.4
	Clerk	3	2.1	2.1	13.6
	Computer Advisor	1	.7	.7	14.3
	DB Admin	1	.7	.7	15.0

	Dealer	3	2.1	2.1	17.1
	Dept Head	2	1.4	1.4	18.6
	Director	1	.7	.7	19.3
	Economist	1	.7	.7	20.0
	Employee	1	.7	.7	20.7
	Engineer	4	2.9	2.9	23.6
	Finance Analyst	1	.7	.7	24.3
	Industry Expert	1	.7	.7	25.0
	IT Engineer	2	1.4	1.4	26.4
	Lab Technician	1	.7	.7	27.1
	Lecturer	5	3.6	3.6	30.7
	Legal Advisor	1	.7	.7	31.4
	Manager	1	.7	.7	32.1
	Network Manager	1	.7	.7	32.9
	Physicist	1	.7	.7	33.6
	Planner	1	.7	.7	34.3
	Public Relations	1	.7	.7	35.0
	Safety Admin	1	.7	.7	35.7
	Stat Expert	1	.7	.7	36.4
	Student	40	28.6	28.6	65.0
	System Eng	1	.7	.7	65.7
	Systems Analyst	1	.7	.7	66.4
	Teacher	5	3.6	3.6	70.0
	Technician	1	.7	.7	70.7
	Tele Eng	1	.7	.7	71.4
	Undergrad	40	28.6	28.6	100.0
	Total	140	100.0	100.0	

Q4. INCOME					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**Less then 200 (OMR)**	79	56.4	56.8	56.8
	200 – 500	5	3.6	3.6	60.4
	500 – 900	30	21.4	21.6	82.0
	Above 900	25	17.9	18.0	100.0

	Total	139	99.3	100.0	
Missing	**System**	1	.7		
Total		140	100.0		

Q5. WORK ON PC (No = 0, Yes = 1)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	1	.7	.7	.7
	1	139	99.3	99.3	100.0
	Total	140	100.0	100.0	

Q6. PLACE TO USE PC(Home = 1, Work = 2, School = 3, Others = 4)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**1**	38	27.1	27.3	27.3
	2	17	12.1	12.2	39.6
	3	1	.7	.7	40.3
	4	13	9.3	9.4	49.6
	1 & 2	40	28.6	28.8	78.4
	1 & 3	4	2.9	2.9	81.3
	1 & 4	16	11.4	11.5	92.8
	3 & 4	1	.7	.7	93.5
	1, 2 & 3	2	1.4	1.4	95.0
	1,2 & 4	3	2.1	2.2	97.1
	1, 3 & 4	2	1.4	1.4	98.6
	1, 2, 3 & 4	2	1.4	1.4	100.0
	Total	139	99.3	100.0	
Missing	**System**	1	.7		
Total		140	100.0		

Q7. TIME DAILY USING PC					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**Less than 1 hour**	28	20.0	20.3	20.3
	1 to 3	67	47.9	48.6	68.8
	4 to 10	36	25.7	26.1	94.9

	More than 10	7	5.0	5.1	100.0
	Total	138	98.6	100.0	
Missing	**System**	2	1.4		
Total		140	100.0		

Q8. USES OF PC (Internet app = 1, Office App = 2, Games & Entertainment = 3, Others = 4)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**1**	21	15.0	15.2	15.2
	2	12	8.6	8.7	23.9
	3	7	5.0	5.1	29.0
	4	4	2.9	2.9	31.9
	12	37	26.4	26.8	58.7
	13	10	7.1	7.2	65.9
	14	6	4.3	4.3	70.3
	23	3	2.1	2.2	72.5
	24	3	2.1	2.2	74.6
	34	1	.7	.7	75.4
	123	20	14.3	14.5	89.9
	124	7	5.0	5.1	94.9
	134	2	1.4	1.4	96.4
	234	1	.7	.7	97.1
	1234	4	2.9	2.9	100.0
	Total	138	98.6	100.0	
Missing	**System**	2	1.4		
Total		140	100.0		

COMPUTER LITERACY (No = 0, Yes = 1)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	26	18.6	18.6	18.6
	1	114	81.4	81.4	100.0
	Total	140	100.0	100.0	

Q9. USE INTERNET (No = 0, Yes = 1)				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**

Valid	0	4	2.9	2.9	2.9
	1	136	97.1	97.1	100.0
	Total	140	100.0	100.0	

Q10. TIME DAILY USING INTERNET					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 hour	47	33.6	35.3	35.3
	1 to 3	67	47.9	50.4	85.7
	3 to 6	14	10.0	10.5	96.2
	More than 6	5	3.6	3.8	100.0
	Total	133	95.0	100.0	
Missing	System	7	5.0		
Total		140	100.0		

Q11. PLACE TO USE INTERNET (Home = 1, Work = 2, Internet café = 3, School = 4)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	46	32.9	34.3	34.3
	2	19	13.6	14.2	48.5
	3	13	9.3	9.7	58.2
	4	10	7.1	7.5	65.7
	1 & 2	30	21.4	22.4	88.1
	1 & 3	4	2.9	3.0	91.0
	1 & 4	4	2.9	3.0	94.0
	2 & 3	1	.7	.7	94.8
	2 & 4	1	.7	.7	95.5
	3 & 4	2	1.4	1.5	97.0
	1,2 & 3	3	2.1	2.2	99.3
	1, 3 & 4	1	.7	.7	100.0
	Total	134	95.7	100.0	
Missing	System	6	4.3		
Total		140	100.0		

Q12. MONTHLY COST TO USE INTERNET					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5 (OMR)	47	33.6	38.2	38.2
	5 to 10	43	30.7	35.0	73.2
	10 to 25	28	20.0	22.8	95.9
	More than 25	5	3.6	4.1	100.0
	Total	123	87.9	100.0	
Missing	System	17	12.1		
Total		140	100.0		

Q13. INTERNET USES (Email = 1, Chatting and Entertainment = 2, Information and Knowledge Search = 3, Others = 4)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	4.3	4.5	4.5
	2	4	2.9	3.0	7.5
	3	19	13.6	14.3	21.8
	4	1	.7	.8	22.6
	1 & 2	6	4.3	4.5	27.1
	1 & 3	48	34.3	36.1	63.2
	2 & 3	5	3.6	3.8	66.9
	3 & 4	2	1.4	1.5	68.4
	1, 2 & 3	29	20.7	21.8	90.2
	1, 2 & 4	3	2.1	2.3	92.5
	1, 3 & 4	4	2.9	3.0	95.5
	1, 2, 3 & 4	6	4.3	4.5	100.0
	Total	133	95.0	100.0	
Missing	System	7	5.0		
Total		140	100.0		

INTERNET LITERACY (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	61	43.6	43.6	43.6
	1	79	56.4	56.4	100.0

	Total	140	100.0	100.0	

Q14.a. SHOPPED ON THE INTERNET (No = 0, Yes = 1)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	103	73.6	74.1	74.1
	1	36	25.7	25.9	100.0
	Total	139	99.3	100.0	
Missing	**System**	1	.7		
Total		140	100.0		

Q14.b. SEARCH FOR INFO ABOUT GOODS IN THE INTERNET (No = 0, Yes = 1)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	46	32.9	33.1	33.1
	1	93	66.4	66.9	100.0
	Total	139	99.3	100.0	
Missing	**System**	1	.7		
Total		140	100.0		

Q14.c. PAID FOR GOODS IN THE INTERNET (No = 0, Yes = 1)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	115	82.1	82.7	82.7
	1	24	17.1	17.3	100.0
	Total	139	99.3	100.0	
Missing	**System**	1	.7		
Total		140	100.0		

Q14.d. REQUESTED INFO ABOUT GOODS IN THE INTERNET (No = 0, Yes = 1)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	61	43.6	43.9	43.9
	1	78	55.7	56.1	100.0
	Total	139	99.3	100.0	
Missing	**System**	1	.7		
Total		140	100.0		

Q14.e. PAID UTILITIES BILLS IN THE INTERNET (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	126	90.0	90.6	90.6
	1	13	9.3	9.4	100.0
	Total	139	99.3	100.0	
Missing	System	1	.7		
Total		140	100.0		

Q14.f. PERFORMED OTHER E-COMMERCE TRANSACTIONS (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	113	80.7	81.9	81.9
	1	25	17.9	18.1	100.0
	Total	138	98.6	100.0	
Missing	System	2	1.4		
Total		140	100.0		

Q15. WILLINGNESS TO DO E-COMMERCE (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	17	12.1	14.3	14.3
	1	102	72.9	85.7	100.0
	Total	119	85.0	100.0	
Missing	System	21	15.0		
Total		140	100.0		

E-COMMERCE LITERACY (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	72	51.4	51.7	51.7
	1	68	48.6	81.4	100.0
	Total	140	100.0	100.0	

Q16. INTENTION TO DO TRANSACTION(S) WITH GOVERNMENT (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	28	20.0	20.4	20.4
	1	109	77.9	79.6	100.0
	Total	137	97.9	100.0	
Missing	System	3	2.1		
Total		140	100.0		

Q17. NUMBER OF ANNUAL GOVERNMENT TRANSACTIONS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5	65	46.4	59.1	59.1
	5 to 10	25	17.9	22.7	81.8
	10 to 20	10	7.1	9.1	90.9
	More than 20	10	7.1	9.1	100.0
	Total	110	78.6	100.0	
Missing	System	30	21.4		
Total		140	100.0		

Q18. CHANNELS OF TRANSACTIONS (Face to face = 1, Agent = 2, Phone = 3, Others = 4)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	83	59.3	69.7	69.7
	2	6	4.3	5.0	74.8
	3	6	4.3	5.0	79.8
	1 & 2	10	7.1	8.4	88.2
	1 & 3	6	4.3	5.0	93.3
	1, 2 & 3	7	5.0	5.9	99.2
	1, 2, 3 & 4	1	.7	.8	100.0
	Total	119	85.0	100.0	
Missing	System	21	15.0		
Total		140	100.0		

Q20. AWARENESS OF E-GOVERNMENT CONCEPT (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	47	33.6	33.6	33.6
	1	93	66.4	66.4	100.0
	Total	140	100.0	100.0	

Q21.a. E-GOVERNMENT HELPFUL TO OMAN (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	7	5.0	5.0	5.0
	1	133	95.0	95.0	100.0
	Total	140	100.0	100.0	

Q21.b. WILLINGNESS TO USE E-GOVERNMENT (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	5.7	5.7	5.7
	1	132	94.3	94.3	100.0
	Total	140	100.0	100.0	

Q21.c. AWARENESS OF E-GOVERNMENT INITIATIVES IN OMAN (No = 0, Yes = 1)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	89	63.6	63.6	63.6
	1	51	36.4	36.4	100.0
	Total	140	100.0	100.0	

BARRIER1 (Lack of users' IT knowledge, awareness and motivation)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	3.6	3.6	3.6
	2	14	10.0	10.0	13.6
	3	36	25.7	25.7	39.3
	4	36	25.7	25.7	65.0
	5	49	35.0	35.0	100.0
	Total	140	100.0	100.0	

BARRIER2 (Lack of skilled IT staff)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	8.6	8.6	8.6
	2	25	17.9	17.9	26.4
	3	51	36.4	36.4	62.9
	4	30	21.4	21.4	84.3
	5	22	15.7	15.7	100.0
	Total	140	100.0	100.0	

BARRIER3 (Internet and computer cost)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	15.7	15.8	15.8
	2	25	17.9	18.0	33.8
	3	40	28.6	28.8	62.6
	4	26	18.6	18.7	81.3
	5	26	18.6	18.7	100.0
	Total	139	99.3	100.0	
Missing	System	1	.7		
Total		140	100.0		

BARRIER4 (Lack of users' trust and confidence)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	13	9.3	9.3	9.3
	2	25	17.9	17.9	27.1
	3	43	30.7	30.7	57.9
	4	27	19.3	19.3	77.1
	5	32	22.9	22.9	100.0
	Total	140	100.0	100.0	

BARRIER5 (Lack of security)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	9	6.4	6.4	6.4
	2	24	17.1	17.1	23.6
	3	40	28.6	28.6	52.1
	4	36	25.7	25.7	77.9
	5	31	22.1	22.1	100.0
	Total	140	100.0	100.0	

BARRIER6 (Culture and language conflict)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	8.6	8.6	8.6
	2	27	19.3	19.3	27.9
	3	44	31.4	31.4	59.3
	4	40	28.6	28.6	87.9
	5	17	12.1	12.1	100.0
	Total	140	100.0	100.0	

BARRIER7 (Poor infrastructure and technologies)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	11	7.9	7.9	7.9
	2	19	13.6	13.7	21.6
	3	46	32.9	33.1	54.7
	4	35	25.0	25.2	79.9
	5	28	20.0	20.1	100.0
	Total	139	99.3	100.0	
Missing	System	1	.7		
Total		140	100.0		

BARRIER8 (Lack of top officials commitment and understandings)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	14	10.0	10.0	10.0
	2	20	14.3	14.3	24.3
	3	51	36.4	36.4	60.7
	4	30	21.4	21.4	82.1
	5	25	17.9	17.9	100.0
	Total	140	100.0	100.0	

BARRIER9 (Bad project control and management)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	8.6	8.6	8.6
	2	24	17.1	17.3	25.9
	3	55	39.3	39.6	65.5
	4	23	16.4	16.5	82.0
	5	25	17.9	18.0	100.0
	Total	139	99.3	100.0	
Missing	System	1	.7		
Total		140	100.0		

BARRIER10 (Lack of users' inputs and feedbacks)					
Relevance (1-5)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	4.3	4.3	4.3
	2	25	17.9	18.0	22.3
	3	52	37.1	37.4	59.7
	4	38	27.1	27.3	87.1
	5	18	12.9	12.9	100.0
	Total	139	99.3	100.0	
Missing	System	1	.7		
Total		140	100.0		

BARRIER11 (Lack of funding)					
Relevance (1-5)		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**1**	17	12.1	12.3	12.3
	2	22	15.7	15.9	28.3
	3	46	32.9	33.3	61.6
	4	32	22.9	23.2	84.8
	5	21	15.0	15.2	100.0
	Total	138	98.6	100.0	
Missing	**System**	2	1.4		
Total		140	100.0		

BARRIER12 (Lack of proper legislations and laws)					
Relevance (1-5)		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**1**	16	11.4	11.4	11.4
	2	26	18.6	18.6	30.0
	3	27	19.3	19.3	49.3
	4	27	19.3	19.3	68.6
	5	44	31.4	31.4	100.0
	Total	140	100.0	100.0	

BARRIER13 (Lack of marketing campaigns)					
Relevance (1-5)		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**1**	10	7.1	7.1	7.1
	2	16	11.4	11.4	18.6
	3	30	21.4	21.4	40.0
	4	33	23.6	23.6	63.6
	5	51	36.4	36.4	100.0
	Total	140	100.0	100.0	

Key Statistics of Barriers to Adoption														
		BARRIER 1	BARRIER 2	BARRIER 3	BARRIER 4	BARRIER 5	BARRIER 6	BARRIER 7	BARRIER 8	BARRIER 9	BARRIER 10	BARRIER 11	BARRIER 12	BARRIER 13
N	Valid	140	140	139	140	140	140	139	140	139	139	138	140	140
	Missing	0	0	1	0	0	0	1	0	1	1	2	0	0
Mean		3.79	3.18	3.06	3.29	3.40	3.16	3.36	3.23	3.18	3.27	3.13	3.41	3.71
Std. Deviation		1.14	1.16	1.33	1.26	1.19	1.14	1.18	1.20	1.17	1.04	1.22	1.39	1.27
Variance		1.29	1.34	1.76	1.59	1.42	1.29	1.39	1.43	1.38	1.08	1.49	1.94	1.60
Skewness		-.582	-.074	-.045	-.140	-.250	-.179	-.276	-.170	-.003	-.083	-.155	-.308	-.638
Std. Error of Skewness		.205	.205	.206	.205	.205	.205	.206	.205	.206	.206	.206	.205	.205
Range		4	4	4	4	4	4	4	4	4	4	4	4	4
Minimum		1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum		5	5	5	5	5	5	5	5	5	5	5	5	5

Correlation Tables

CORRELATION RESULTS FOR ALL AGE CLASSES AND KEY DEPENDENT VARIABLES

	Age	*Computer Literacy*	*Internet Literacy*	*E-com Literacy*	Willingness to use E-com	Willingness to use E-gov	Awareness of e-gov in Oman	Awareness of e-gov in General
Age	1							
Computer Literacy	0.661	1						
Internet Literacy	0.346	0.929	1					
E-com Literacy	0.537	0.985	0.977	1				
Willingness to use E-com	0.829	0.907	0.760	0.871	1			
Willingness to use E-gov	0.671	0.409	0.259	0.385	0.748	1		
Awareness of e-gov in Oman	0.459	0.896	0.858	0.875	0.640	-0.029	1	
Awareness of e-gov in General	0.921	0.835	0.577	0.726	0.836	0.420	0.761	1

CORRELATION RESULTS FOR AGE (EXCLUDING THE ABOVE 40 CLASS) AND KEY DEPENDENT VARIABLES

	Age	*Computer Literacy*	*Internet Literacy*	*E-com Literacy*	Willingness to use E-com	Willingness to use E-gov	Awareness of e-gov in Oman	Awareness of e-gov in General
Age	1							
Computer Literacy	0.999	1						
Internet Literacy	0.999	0.996	1					
E-com Literacy	0.999	0.997	1.000	1				
Willingness to use E-com	0.961	0.948	0.972	0.971	1			
Willingness to use E-gov	0.495	0.456	0.530	0.526	0.715	1		
Awareness of e-gov in Oman	0.890	0.909	0.871	0.873	0.730	0.045	1	
Awareness of e-gov in General	0.950	0.963	0.936	0.938	0.826	0.198	0.988	1

CORRELATION RESULTS FOR ALL INCOME LEVELS AND KEY DEPENDENT VARIABLES

	Income	*Computer Literacy*	*Internet Literacy*	*E-com Literacy*	Willingness to use E-com	Willingness to use E-gov	Awareness of e-gov in Oman	Awareness of e-gov in General
Income	1							
Computer Literacy	0.973	1						
Internet Literacy	0.424	0.602	1					
E-com Literacy	0.638	0.735	0.894	1				
Willingness to use E-com	0.913	0.935	0.681	0.891	1			
Willingness to use E-gov	0.447	0.534	0.830	0.960	0.772	1		
Awareness of e-gov in Oman	0.813	0.894	0.585	0.524	0.701	0.268	1	
Awareness of e-gov in General	0.579	0.642	0.796	0.975	0.859	0.986	0.351	1

CORRELATION RESULTS FOR ALL EDUCATION LEVELS AND KEY DEPENDENT VARIABLES

	Education	*Computer Literacy*	*Internet Literacy*	*E-com Literacy*	Willingness to use E-com	Willingness to use E-gov	Awareness of e-gov in Oman	Awareness of e-gov in General
Education	1							
Computer Literacy	0.917	1						
Internet Literacy	0.965	0.985	1					
E-com Literacy	0.991	0.943	0.985	1				
Willingness to use E-com	0.925	0.994	0.992	0.958	1			
Willingness to use E-gov	0.793	0.969	0.918	0.838	0.956	1		
Awareness of e-gov in Oman	0.988	0.904	0.943	0.964	0.898	0.781	1	
Awareness of e-gov in General	0.981	0.909	0.940	0.956	0.898	0.792	0.998	1

CORRELATION RESULTS FOR AGE AND THE 13 E-GOVERNMENT BARRIERS

	Age	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
Age	1													
Barrier1	0.727	1												
Barrier2	0.853	0.972	1											
Barrier3	-0.831	-0.986	-0.993	1										
Barrier4	0.830	0.607	0.659	-0.696	1									
Barrier5	0.929	0.656	0.744	-0.758	0.976	1								
Barrier6	0.905	0.893	0.971	-0.941	0.614	0.740	1							
Barrier7	0.996	0.748	0.874	-0.847	0.788	0.900	0.932	1						
Barrier8	0.994	0.727	0.861	-0.829	0.765	0.884	0.929	0.998	1					
Barrier9	0.938	0.635	0.733	-0.743	0.967	0.998	0.741	0.909	0.896	1				
Barrier10	0.077	0.605	0.421	-0.513	0.399	0.266	0.195	0.062	0.018	0.217	1			
Barrier11	0.319	0.772	0.628	-0.706	0.562	0.467	0.427	0.308	0.266	0.423	0.968	1		
Barrier12	0.575	0.878	0.791	-0.853	0.743	0.687	0.633	0.564	0.526	0.652	0.859	0.958	1	
Barrier13	0.662	0.704	0.669	-0.735	0.928	0.854	0.542	0.624	0.588	0.827	0.711	0.822	0.915	1

CORRELATION RESULTS FOR EDUCATION AND THE 13 E-GOVERNMENT BARRIERS

	Education	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
Education	1													
Barrier 1	0.794	1												
Barrier 2	0.798	0.998	1											
Barrier 3	0.788	0.998	0.999	1										
Barrier 4	0.880	0.987	0.987	0.985	1									
Barrier 5	0.868	0.986	0.980	0.978	0.994	1								
Barrier 6	0.782	0.999	0.998	0.998	0.984	0.982	1							
Barrier 7	0.852	0.994	0.990	0.989	0.997	0.998	0.991	1						
Barrier 8	0.823	0.998	0.998	0.997	0.994	0.990	0.997	0.996	1					
Barrier 9	0.808	0.998	0.993	0.993	0.988	0.992	0.997	0.996	0.996	1				
Barrier 10	0.776	0.999	0.996	0.997	0.982	0.982	0.999	0.990	0.996	0.997	1			
Barrier 11	0.723	0.990	0.981	0.983	0.959	0.970	0.991	0.976	0.981	0.990	0.993	1		
Barrier 12	0.806	0.998	0.993	0.993	0.988	0.992	0.997	0.996	0.997	0.999	0.998	0.991	1	
Barrier 13	0.7887	0.991	0.981	0.981	0.976	0.989	0.989	0.990	0.987	0.996	0.992	0.993	0.996	1

CORRELATION RESULTS FOR INCOME AND THE 13 E-GOVERNMENT BARRIERS

	Income	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
Income	1													
Barrier1	0.146	1												
Barrier2	0.561	-0.567	1											
Barrier3	-0.022	0.966	-0.754	1										
Barrier4	0.168	0.991	-0.485	0.931	1									
Barrier5	0.611	0.865	-0.121	0.736	0.882	1								
Barrier6	0.174	0.852	-0.713	0.916	0.781	0.709	1							
Barrier7	0.978	-0.060	0.693	-0.227	-0.035	0.438	-0.011	1						
Barrier8	0.598	0.570	-0.304	0.587	0.497	0.683	0.842	0.473	1					
Barrier9	0.640	0.853	-0.157	0.743	0.855	0.991	0.765	0.467	0.772	1				
Barrier10	-0.312	0.791	-0.948	0.920	0.721	0.429	0.877	-0.487	0.499	0.459	1			
Barrier11	-0.226	0.814	-0.923	0.935	0.741	0.486	0.918	-0.406	0.577	0.523	0.995	1		
Barrier12	-0.072	0.933	-0.813	0.993	0.885	0.675	0.935	-0.273	0.605	0.693	0.955	0.968	1	
Barrier13	-0.271	0.711	-0.948	0.865	0.623	0.369	0.895	-0.432	0.583	0.422	0.982	0.986	0.915	1

CORRELATION RESULTS FOR INCOME (EXCLUDING STUDENTS) AND THE 13 E-GOVERNMENT BARRIERS

	Income	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
Income	1													
Barrier 1	-0.987	1												
Barrier 2	0.820	-0.900	1											
Barrier 3	-0.929	0.976	-0.973	1										
Barrier 4	-0.999	0.982	-0.804	0.918	1									
Barrier 5	-0.997	0.973	-0.776	0.900	0.999	1								
Barrier 6	-0.627	0.742	-0.960	0.870	0.605	0.569	1							
Barrier 7	0.998	-0.994	0.848	-0.947	-0.996	-0.992	-0.666	1						
Barrier 8	0.082	0.076	-0.502	0.291	-0.109	-0.153	0.724	0.031	1					
Barrier 9	-0.866	0.934	-0.996	0.989	0.851	0.827	0.932	-0.890	0.427	1				
Barrier 10	-0.842	0.917	-0.999	0.981	0.827	0.801	0.948	-0.868	0.467	0.998	1			
Barrier 11	-0.809	0.892	-0.999	0.969	0.793	0.765	0.964	-0.838	0.518	0.994	0.998	1		
Barrier 12	-0.888	0.950	-0.991	0.995	0.875	0.853	0.914	-0.911	0.383	0.998	0.995	0.988	1	
Barrier 13	-0.725	0.825	-0.988	0.928	0.706	0.674	0.991	-0.759	0.626	0.972	0.981	0.991	0.960	1

CORRELATION RESULTS FOR COMPUTER LITERACY AND THE 13 E-GOVERNMENT BARRIERS

	Computer Literacy	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
Computer Literacy	1													
Barrier 1	1	1												
Barrier 2	1	1	1											
Barrier 3	1	1	1	1										
Barrier 4	1	1	1	1	1									
Barrier 5	1	1	1	1	1	1								
Barrier 6	1	1	1	1	1	1	1							
Barrier 7	1	1	1	1	1	1	1	1						
Barrier 8	1	1	1	1	1	1	1	1	1					
Barrier 9	1	1	1	1	1	1	1	1	1	1				
Barrier 10	1	1	1	1	1	1	1	1	1	1	1			
Barrier 11	1	1	1	1	1	1	1	1	1	1	1	1		
Barrier 12	1	1	1	1	1	1	1	1	1	1	1	1	1	
Barrier 13	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1

CORRELATION RESULTS FOR INTERNET LITERACY AND THE 13 E-GOVERNMENT BARRIERS

	Internet Literacy	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
Internet Literacy	1													
Barrier 1	1	1												
Barrier 2	1	1	1											
Barrier 3	1	1	1	1										
Barrier 4	1	1	1	1	1									
Barrier 5	1	1	1	1	1	1								
Barrier 6	1	1	1	1	1	1	1							
Barrier 7	1	1	1	1	1	1	1	1						
Barrier 8	1	1	1	1	1	1	1	1	1					
Barrier 9	-1	-1	-1	-1	-1	-1	-1	-1	-1	1				
Barrier 10	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	1			
Barrier 11	0	0	0	0	0	0	0	0	0	0	0	1		
Barrier 12	1	1	1	1	1	1	1	1	1	-1	-1	0	1	
Barrier 13	1	1	1	1	1	1	1	1	1	-1	-1	0	1	1

CORRELATION RESULTS FOR E-COMMERCE LITERACY AND THE 13 E-GOVERNMENT BARRIERS

	E-com Literacy	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
E-com Literacy	1													
Barrier 1	1	1												
Barrier 2	1	1	1											
Barrier 3	1	1	1	1										
Barrier 4	1	1	1	1	1									
Barrier 5	1	1	1	1	1	1								
Barrier 6	-1	-1	-1	-1	-1	-1	1							
Barrier 7	1	1	1	1	1	1	-1	1						
Barrier 8	1	1	1	1	1	1	-1	1	1					
Barrier 9	0	0	0	0	0	0	0	0	0	1				
Barrier 10	-1	-1	-1	-1	-1	-1	1	-1	-1	0	1			
Barrier 11	-1	-1	-1	-1	-1	-1	1	-1	-1	0	1	1		
Barrier 12	1	1	1	1	1	1	-1	1	1	0	-1	-1	1	
Barrier 13	1	1	1	1	1	1	-1	1	1	0	-1	-1	1	1

CORRELATION RESULTS FOR WILLINGNESS TO E-GOVERNMENT AND THE 13 E-GOVERNMENT BARRIERS

	E-gov Willingness	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
E-gov Willingness	1													
Barrier 1	-1	1												
Barrier 2	-1	1	1											
Barrier 3	-1	1	1	1										
Barrier 4	-1	1	1	1	1									
Barrier 5	1	-1	-1	-1	-1	1								
Barrier 6	1	-1	-1	-1	-1	1	1							
Barrier 7	-1	1	1	1	1	-1	-1	1						
Barrier 8	1	-1	-1	-1	-1	1	1	-1	1					
Barrier 9	1	-1	-1	-1	-1	1	1	-1	1	1				
Barrier 10	1	-1	-1	-1	-1	1	1	-1	1	1	1			
Barrier 11	1	-1	-1	-1	-1	1	1	-1	1	1	1	1		
Barrier 12	-1	1	1	1	1	-1	-1	1	-1	-1	-1	-1	1	
Barrier 13	-1	1	1	1	1	-1	-1	1	-1	-1	-1	-1	1	1

CORRELATION RESULTS FOR AWARENESS OF E-GOVERNMENT INITIATIVES IN OMAN AND THE 13 E-GOVERNMENT BARRIERS

	E-gov Awareness in Oman	*Barrier 1*	*Barrier 2*	*Barrier 3*	*Barrier 4*	*Barrier 5*	*Barrier 6*	*Barrier 7*	*Barrier 8*	*Barrier 9*	*Barrier 10*	*Barrier 11*	*Barrier 12*	*Barrier 13*
E-gov Awareness in Oman	1													
Barrier 1	1	1												
Barrier 2	-1	-1	1											
Barrier 3	-1	-1	1	1										
Barrier 4	1	1	-1	-1	1									
Barrier 5	1	1	-1	-1	1	1								
Barrier 6	1	1	-1	-1	1	1	1							
Barrier 7	1	1	-1	-1	1	1	1	1						
Barrier 8	1	1	-1	-1	1	1	1	1	1					
Barrier 9	1	1	-1	-1	1	1	1	1	1	1				
Barrier 10	-1	-1	1	1	-1	-1	-1	-1	-1	-1	1			
Barrier 11	-1	-1	1	1	-1	-1	-1	-1	-1	-1	1	1		
Barrier 12	-1	-1	1	1	-1	-1	-1	-1	-1	-1	1	1	1	
Barrier 13	1	1	-1	-1	1	1	1	1	1	1	-1	-1	-1	1

Chi-Square Tables

CHI SQUARE CONTINGENCY TABLE FOR INCOME AND BARRIER 3

Income	Relevance - Barrier 3					
	Very low	Low	Neutral	High	Very high	Totals
Less then 200						
Actual	14	14	25	10	16	79
Expected	12.59	14.31	22.90	14.31	14.88	79.00
xSquared	0.16	0.01	0.19	1.30	0.08	1.74
Between 200 and 500						
Actual	0	2	0	2	1	5
Expected	0.80	0.91	1.45	0.91	0.94	5.00
xSquared	0.80	1.32	1.45	1.32	0.00	4.89
Between 500 and 900						
Actual	5.00	6.00	7.00	4.00	8.00	30.00
Expected	4.78	5.43	8.70	5.43	5.65	30.00
xSquared	0.01	0.06	0.33	0.38	0.98	1.75
Above 900						
Actual	3	3	8	9	1	24
Expected	3.83	4.35	6.96	4.35	4.52	24.00
xSquared	0.18	0.42	0.16	4.98	2.74	8.47
Totals	22.00	25.00	40.00	25.00	26.00	138.00
					Chi Squared	**16.86**

CHI SQUARE CONTINGENCY TABLE FOR INCOME AND BARRIER 10

Income	Relevance - Barrier 10					
	Very low	Low	Neutral	High	Very high	Totals
Less then 200						
Actual	4	15	25	26	9	79
Expected	3.43	14.31	29.20	21.75	10.30	79.00
xSquared	0.09	0.03	0.60	0.83	0.17	1.72
Between 200 and 500						
Actual	0	1	1	1	2	5
Expected	0.22	0.91	1.85	1.38	0.65	5.00
xSquared	0.22	0.01	0.39	0.10	2.79	3.50
Between 500 and 900						
Actual	2.00	5.00	11.00	7.00	4.00	29.00
Expected	1.26	5.25	10.72	7.99	3.78	29.00
xSquared	0.43	0.01	0.01	0.12	0.01	0.59
Above 900						
Actual	0	4	14	4	3	25
Expected	1.09	4.53	9.24	6.88	3.26	25.00
xSquared	1.09	0.06	2.45	1.21	0.02	4.83
Totals	6.00	25.00	51.00	38.00	18.00	138.00
					Chi Squared	**10.65**

CHI SQUARE CONTINGENCY TABLE FOR INCOME AND BARRIER 11

Income	Relevance - Barrier 11					
	Very low	Low	Neutral	High	Very high	Totals
Less then 200						
Actual	12	11	25	17	13	78
Expected	9.47	12.26	25.63	17.83	12.81	78.00
xSquared	0.68	0.13	0.02	0.04	0.00	0.86
Between 200 and 500						
Actual	0	1	2	0	5	8
Expected	0.97	1.26	2.63	1.83	1.31	8.00
xSquared	0.97	0.05	0.15	1.83	10.34	13.34
Between 500 and 900						
Actual	5.00	4.00	8.00	10.00	3.00	30.00
Expected	3.64	4.71	9.86	6.86	4.93	30.00
xSquared	0.51	0.11	0.35	1.44	0.75	3.16
Above 900						
Actual	0	6	11	5	2	24
Expected	2.91	3.77	7.89	5.49	3.94	24.00
xSquared	2.91	1.32	1.23	0.04	0.96	6.46
Totals	17.00	22.00	46.00	32.00	23.00	140.00
					Chi Squared	**23.82**

CHI SQUARE CONTINGENCY TABLE FOR INCOME AND BARRIER 12

Income	Relevance - Barrier 12					
	Very low	Low	Neutral	High	Very high	Totals
Less then 200						
Actual	10	16	15	15	23	79
Expected	9.09	14.78	15.35	15.35	24.44	79.00
xSquared	0.09	0.10	0.01	0.01	0.08	0.29
Between 200 and 500						
Actual	1	0	0	1	3	5
Expected	0.58	0.94	0.97	0.97	1.55	5.00
xSquared	0.31	0.94	0.97	0.00	1.37	3.59
Between 500 and 900						
Actual	4.00	5.00	5.00	5.00	11.00	30.00
Expected	3.45	5.61	5.83	5.83	9.28	30.00
xSquared	0.09	0.07	0.12	0.12	0.32	0.71
Above 900						
Actual	1	5	7	6	6	25
Expected	2.88	4.68	4.86	4.86	7.73	25.00
xSquared	1.23	0.02	0.95	0.27	0.39	2.85
Totals	16.00	26.00	27.00	27.00	43.00	139.00
					Chi Squared	**7.44**

CHI SQUARE CONTINGENCY TABLE FOR INCOME AND BARRIER 12

Income	Relevance - Barrier 13					
	Very low	Low	Neutral	High	Very high	Totals
Less then 200						
Actual	6	10	15	18	30	79
Expected	5.68	9.09	17.05	18.19	28.99	79.00
xSquared	0.02	0.09	0.25	0.00	0.04	0.39
Between 200 and 500						
Actual	1	0	0	1	3	5
Expected	0.36	0.58	1.08	1.15	1.83	5.00
xSquared	1.14	0.58	1.08	0.02	0.74	3.55
Between 500 and 900						
Actual	3.00	3.00	7.00	6.00	11.00	30.00
Expected	2.16	3.45	6.47	6.91	11.01	30.00
xSquared	0.33	0.06	0.04	0.12	0.00	0.55
Above 900						
Actual	0	3	8	7	7	25
Expected	1.80	2.88	5.40	5.76	9.17	25.00
xSquared	1.80	0.01	1.26	0.27	0.51	3.84
Totals	10.00	16.00	30.00	32.00	51.00	139.00
					Chi Squared	**8.34**

Appendix D—Indexed Interviews

Interview One

Date of Interview: 1st December 2003
Date of Indexing: 29th April 2004
Interviewee: GM and Head, Information Systems
Muscat Municipality (MM) www.mm.gov.om/mainsite/

E-government / E-commerce Plans and Strategies

- MM's vision is to enable citizens and residents to access MM services easily and conveniently, regardless of their education, culture or location. The elements of this basic vision are:
  - disparity in education and culture
  - difference in place and time
  - discrepancy between income and affordable technology.
- MM's strategy is to:
  - create a mechanism for the provision of information outside the Municipality premises that extends beyond official working hours
  - provide several techniques that are suitable to all citizens and find ways for electronic progress
  - disseminate awareness of e-services among employees and citizens
  - develop rules and regulations pertinent to the e-services trends
  - encourage and motivate users to use e-services.

E-government / E-commerce Accomplishments

- Clients can utilise MM's online services using their PCs, PDAs, GSMs or some designated internet cafés and service bureaus. Payment for transactions with MM can be made from:
  - MM website using credit cards.
  - MM's website using local internet banking systems. Clients will be asked to nominate a bank and perform a simple fund transfer from their account to that of the Municipality.
  - From internet cafés or service bureaus acting as agents or intermediaries between clients and MM. Clients, especially computer and internet illiterates, can get help in conducting electronic transactions with MM. For payment purposes, internet cafés and service bureaus are asked to establish monetary accounts with MM (paying a certain amount in advance), which can be used later to pay for client transactions in return for cash and a small fee from the clients.
  - MM's website using a prepaid account. This option is designed for corporate agents that usually deposit amounts many times a year. The idea is to pay MM certain amount in advance and deduct from it whenever payments are required. These companies will be notified by SMS and email of their account balance and status.

- MM is applying the BS 7799 security standard, which addresses all security domains from the technical to the environmental and cultural.

> *Security is very vital for e-government and should be viewed as a main priority. E-government systems hold crucial information about the adopting institution and its clients, and therefore should be protected. Any security breach in such systems would not only damage the company's systems, but its image and credibility.*[1]

Issues in E-government Adoption and Dissemination

- MM aims to increase users' trust and awareness of its online services by:
  - conducting internal workshops to inform, educate, and train MM's employees about available and future online services
  - making informative materials (documentaries) available through MM's intranet to enrich employees' experiences in e-government
  - utilising the local media (TV, newspapers, public bulletins, etc) to increase the general public's awareness of the online services
  - conducting training workshops for owners of internet cafés and service bureaus
  - assisting in the development of e-laws and legislation to govern online transactions and payments
  - providing incentives to online users such as reduced transaction fees and fines, offering financial awards to clients who perform a certain number of online transactions, and sending encouragement and support emails
  - hosting electronic forums on MM's main website where clients can post inquiries and concerns and get feedback from Municipality staff.
- Many factors helped in the success of MM's initiatives as follows:
  - leadership support
  - solid planning
  - continuous project monitoring and control
  - utilising the best technologies possible according to available financial resources
  - strong willingness to change from traditional work channels to more progressive, modern and technically safe methods.
- Many barriers were faced by MM in the adoption of online services as follows:
  - lack of e-payment gateway
  - absence of e-laws and regulations
  - citizens' unawareness of technology and low level of IT literacy
  - e-government is not yet a priority among the other government ministries
  - insufficient technical support from the private sector
  - the private sector's incapacity and unwillingness to participate in e-government and e-commerce.

> *The roadmap to e-government implementation in Oman has been developed, but the execution is slow.*

[1] These notes have been transcribed verbatim from original recordings of interviews. Consequently, and given that the first language of all interviewees was not English, they contain numerous errors in expression, grammar and syntax. In the interests of accurate reporting, no attempt has been made to edit these.

Driving forces are essential in the development of ICT sector in Oman. We won't improve our infrastructure if there is no driving force such as adopting e-government or e-commerce. This is why we have to work in parallel. We only started to develop e-legislations when we were forced to [i.e. adopting e-applications also requires e-legislation].

Interview Two

Date of Interview: 1st December 2003
Date of Indexing: 27th April 2004
Interviewee: Director of Internet Department
Royal Oman Police (ROP) www.rop.gov.om/

E-government / E-commerce Plans and Strategies

- Providing services online and adopting up-to-date technologies within ROP are supported by senior officials.
- ROP has been automating transactions in the Directorate General of Traffic and Directorate General of Passports and Residence since the 1980s.

E-government / E-commerce Accomplishments

- ROP faced many security concerns before going online. Its website, launched on 7th of January 2001, offers a range of services to both locals and expatriates. It was initially an information website but many online services were added later including FAQs, instructions on how to accomplish various tasks with ROP, tracking the status of visas, and checking on traffic violations. People can also obtain phone and email contacts for inquiries.

Issues in E-government Adoption and Dissemination

- The majority of people in Oman don't access the ROP website, but the number of visitors is increasing. When ROP launched its online visa status service the usage level increased dramatically, reaching about 12,000–15,000 hits a month. The users were both expatriates and Omanis (as a rule, Omani employers hold expatriate passports and are responsible for renewing their employees' visas). In many instances, the inquirers were not satisfied with or trustful of the results obtained from the website and often attempted to call or report in person to the Directorate General of Passports and Residence to recheck.

> *We've provided the services online and announced it publicly. Our responsibility ends here. The users have to decide themselves on how to use it and we don't want to be involved in this. It's totally up to users, the services are online and we still have the other physical channels available in case they decided not to use the online ones.*

- ROP has conducted many marketing campaigns to increase awareness of its website and the services offered. On many occasions ROP has advertised in national newspapers about the site and its services.
- ROP understands that awareness is very crucial to IT adoption, requiring time and resources. ROP's ultimate aim is to transfer transactions from face-to-face to the website.

> *Performing financial transactions online will be a challenging task. Perhaps OmanTel is not capable or ready to facilitate such platform. Ministry of Commerce and Industry also might not be ready; after all we haven't seen anything like this in Oman yet.*

ROP mission is to enforce laws and legislations. The current laws do not go in depth to cover online activities. The task of making rules, laws and legislations in general is beyond ROP's responsibilities.

- It will take time for IT in general and e-government in particular to be grasped and used widely in Oman.

Interview Three

Date of Interview: 1st December 2003
Date of Indexing: 27th April 2004
Interviewee: Manager Responsible for Civil Status System
Royal Oman Police (ROP) www.rop.gov.om/

E-government / E-commerce Plans and Strategies

- The proposal for a Civil Status System (CSS) was initiated during the first census in Oman in 1993. The Ministers Council approved it and suggested that it should be linked to the National ID card. Royal Decree number 66/99 was issued to grant ROP the necessary authority to develop and run the system.
- CSS holds a database of information about citizens and residents of Oman. Its main goal is to record information pertaining to deaths, births, marriages and divorces in Oman. It will provide statistical information and indicators about these events.
- CSS is supplemented by a new smart ID card, which features biometric recognition. A small electronic microchip is embedded in the card, which will hold a copy of the holder's fingerprint. Each resident or citizen will be given a unique civil number.
- With the civil number, any authorised government unit can access the civil status information of that resident or citizen. This procedure is planned to incorporate strict confidentiality and security measures and standards. The smart ID card will mean people no longer need to carry copies of their IDs and passports for transactions with government units. Such information will be accessed directly from CSS; one will only need to carry his ID card.

E-government / E-commerce Accomplishments

- Collecting information using the CSS commenced in March 2004. Historical information will be gathered and added to the system from institutions that were responsible for collecting it, such as the Ministry of Health and the Ministry of Manpower.
- The Ministries of Health and Justice have already established a link with CSS for information pertaining to death, births, marriage and divorces, in addition to the Ministry of Foreign Affairs, which is responsible for collecting this information from outside Oman's borders.

Issues in E-government Adoption and Dissemination

- System integration can be accomplished with the private sector also, with strong emphasis on confidentiality and security issues. Only the approved segment of CSS information will be shared with an outside institution having the appropriate authentication.
- In addition, people will be able to use their new smart IDs in many other organisations. It could be used as a medical card. The Ministry of Health plans to replace its current medical records system with an electronic one. This new initiative will be linked to and integrated with CSS and the new smart card. A special device will be needed to verify one's fingerprint.

- Resident cards—similar to the new national ID cards—will be issued by ROP to expatriates and will replace the current labour cards. The information from the labour card will be stored on the embedded electronic microchip. National and resident ID cards will be issued to people 15 years old and over.

  > *The new ID card will act as an electronic wallet. An individual will be able to hold money and other information inside its electronic microchip. There are some arrangements currently being negotiated with Bank Muscat in this regard.*

- IDs will be renewed every 5 years because the physical life of the new card is usually 7 to 10 years. There are plans to utilise the same card as a driving license also and it will soon be used in Oman's airport for fast check-in.

Interview Four

Date of Interview: 15th December 2003
Date of Indexing: 8th September 2005
Interviewee: Director Information Systems Department,
Oman Arab Bank (OAB) www.omanab.com/oab.htm

E-government / E-commerce Plans and Strategies

- OAB's IT strategy is to offer self-service IT applications that enable customers to interact and do transactions with the bank 24 hours a day, 7 days a week.
- OAB always bases the extent and level of IT implementation on people's readiness and willingness. This strategy is important to any company

> *OAB does not follow other banks' IT attempts and e-initiatives but always questions people's readiness to use such systems. For example, a feasibility study was conducted a while ago on internet banking and it was seen unfeasible based upon demand. Nowadays, current indicators show that OAB should start thinking to introduce internet banking in the near future. Despite this, it is not seen to be of an urgent matter since adoption rates is not high. The idea is to check on the proper timings to introduce the service and meet all its prerequisites.*

E-government / E-commerce Accomplishments

- OAB's first IT initiative was to develop and build a comprehensive network between and within the bank's branches. This helped to smooth the introduction of further IT initiatives such as the smart card system.
- The smart card system has an offline feature, whereby the card's microchip holds all the information (such as credit amount) required to perform a transaction without the need for a direct link with the bank at the time of transaction. Such a card can be used by taxi drivers to accept payments—even small amounts—using electronic payment devices. In addition, there are no additional costs to traders and businesses utilising this system, such as internet access or transaction fees. The balance is deducted and transferred from the payer's card to the payee's card immediately and the payee can come to the bank to upload new amounts from the device card to their account. Alternatively, using telephone lines and its inbuilt modem the same device can automatically transfer amounts to the customer's OAB account.
- The payee needs a device provided by the bank to accept payments, whereas payers need only a smart card issued by the bank.

Issues in E-government Adoption and Dissemination

> *Technology advances smoothly in Oman and people used to do things manually not long ago that they are doing now electronically. Adoption and technology acceptance progressed at good pace during past few years*

- Private organisations usually choose to adopt new technologies according to people's e-readiness and willingness to use the technology.

- E-initiatives in Oman are highly dependent on decision makers' understanding of and support for them.

  > *At the beginning, users' adoption of the smart card system was very low. It was mainly the fear from losing the money the main hurdle. This caused lots of complaints from higher OAB management that the system is unsuccessful. After sometime, the convenience feature of the application and its advantages convinced many businesses and users to utilise this initiative.*

- The government embraced the smart card system which helped to improve its credibility. In addition, businesses began to utilise it to reduce the need for their agents to carry cash that could easily be misused or lost.
- There is a need to establish coordination between organisations (private and public) in Oman in order to come up with agreed standards and payment methods for the general benefit. However, it is currently hard to do this since there are many different programs and databases available within the various organisation in Oman.
- E-government has many levels of implementation and impacts. Despite how promising e-government system seems to the general public,

  > *…the private organisations in Oman will usually follow people's needs, understanding and capabilities*.

- There are many obstacles to e-government in Oman. E-government should interact with all levels and segments of society, and every member of society should benefit from it. In addition, e-government applications should be carefully designed in a such a way as to facilitate usability (user friendliness).
- A digital divide might also be present among people with higher education since computer education and training has only recently become available.

  > *People were concerned about HOW to do things in the past but now it is more about WHAT to do?*

  which means that technology has become more available, is easily programmable and is gaining momentum.

  > *I don't see cost as possible barrier to e-government. On the other hand, computer education and training is maybe a crucial concern as it's more expensive than owning a PC or paying for few hours in the internet.*
  >
  > *I'm very conservative when it comes to buying online despite my work and knowledge about IT and internet security. The problem is that the system in Oman does not protect me yet, so I have to take care of my own protection.*
  >
  > *The only problem I see with e-government is security and privacy issues. Online laws and legislations are not complete even worldwide because it's hard to detect who committed the crime as there are many ways to hide one's identity and location. Technology advances in both ways, in security and in hacking also.*

- Education and training help to enlighten people about the benefits of technology. Media exposure and marketing will also enhance people's awareness of IT and e-government.

There is a smooth progress in the IT field in Oman and the future is promising, but it is not the government responsibility only to work on this. There is also a strong need to establish an independent entity with proper authority in Oman to look after this project.

Interview Five

Date of Interview: 12th January 2004
Date of Indexing: 5th April 2004
Interviewee: Head Information Systems Department
Ministry of Civil Service (MOCS) www.mocs.gov.om

E-government / E-commerce Plans and Strategies

- MOCS was established in 1988 and since then a dedicated department of Information Systems has been developed to help in automating its basic functions. Distributed systems were used initially, some of which were total failures while others were successful.
- In 1994 the Ministry began formulating an IT strategy in coordination with the World Bank. The strategic aspects included basic office automation, databases and decision support. The primary focus of the strategy was to carry out MOCS internal administrative processes.
- In 2000 the Ministry joined the IT task force (ITTF) team in establishing a national IT strategy for Oman. The strategy was not restricted to e-government, but was directed towards achieving an e-society.

> *Despite the current obstacles to e-government in Oman and the low level of e-readiness in Oman society, we still need to go ahead with the project to increase people's awareness and to start making plans and strategies for ICT development. This will increase users' trust by preparing them to be e-ready well in advance, and will also make government gradually accept the idea of being ready 24/7.*

E-government / E-commerce Accomplishments

- The first MOCS website was developed in 1998. Its main purpose was to provide information to the public but it received very little usage.

> *In 2000, the ministry attempted to eliminate data entry jobs by encouraging all staff to be data entry people. This initiative faced many resistances in the beginning, but after some time, it was proven to be successful. Typists were educated and trained to work better jobs in different areas such as in human resources department.*

- This comment emphasises the fact that educating government staff to increase their skills is crucial in those functional areas that will be largely replaced by e-government.
- A comprehensive human resource system was established by the Ministry and linked to the website. It aims to serve all government staff in areas such as applying for vacations, promotions and financial reimbursements, among others. However, a thorough education campaign is needed to increase awareness of the system and ensure its effectiveness.

Issues in E-government Adoption and Dissemination

> *The society's level of e-readiness in general is still low. People in their 30s and below in general are still either in schools and/or not working or not searching for work at the moment. Thus, they do little transactions with the government and even when they need to transact, they usually depend on relatives and parents to finish their basic government transactions such as renewing IDs and passports. On the other hand, people aged 30 and above don't know how to use computers in general and we should not expect a lot of them in regard to using e-government.*
>
> *I expect that Oman needs at least 5 years from 2003 to achieve a reasonable level of e-readiness. This gives times for the government and schools to qualify younger generations (30 years and below) who are currently involved in schools and education to be more computer and internet literate.*

- Internet speed and available bandwidth are low, and access costs are still high in Oman; these factors cause major technical and financial problems for users and adopters. The network infrastructure in suburban areas is poorly developed, and even in the capital city it is not yet complete.
- Laws and regulations pertaining to online activities are still not in place, thereby adding to the obstacles facing an effective e-government implementation.
- Training institutes exist throughout Oman which can help in educating people who lack computer knowledge and skills.

> *I don't really categorise computer prices and people's affordability as an obstacle, other problems such as people's e-readiness, awareness, and lack of computers in schools are more vital.*
>
> *After one week from launching our revamped website which embedded some online services to the public such as submitting job applications, we've received good feedbacks and hits. There were even incidents when users apparently tried to fool the system or were unsure about the requirements. For example, for a statistician job where education level was set to be bachelor or masters degrees, the site prompted the users to enter their name, ID number and contact address (phone and/or email). Many citizens with secondary education level and lower applied for the job.*
>
> *I believe that females are more likely to benefit and use e-government users in Oman. The conservative nature of our women will encourage them to use e-services at home as it is more reliable and convenient. We've witnessed this in the ministry's website, as most users were ladies.*
>
> *I've performed online payments several times outside Oman and I have positive attitude about it. Despite this, sometimes I prefer to do it face-to-face as an attempt to socialise with people, and/or perhaps to escape from computers. In addition, the fact that I don't trust the company collecting the money because of many calculation mistakes on my previous bills, discourage me from using their system. If the company fails to produce accurate bills, how would it be successful in building an e-payment system that is totally new to it?*

- Marketing, incentives and rewards (such as 10% off the bill amount) should be introduced with the launch of online payment facilities to improve user acceptance. For example, Royal Oman Police could offer citizens the opportunity to download application forms from its website at no cost, whereas obtaining forms from Police offices involves a nominal fee.
- E-government does not have any apparent disadvantages.

> *During the ceremony of launching MOCS website lately, one of the attended ministers said, "We're illiterate". This made to realise that he admired new technologies and was ready to change. It also draws some general conclusions about our senior management ICT knowledge and that they need to be made informed and aware about the potentials of ICT.*
>
> *I have great faith in the coming generations as they are becoming more and more familiar in using computers. They'll most likely resist physical queues and will opt for online business.*
>
> *We can improve take-up rates by advertising initiatives in websites and local papers, and offering added benefits over the normal means.*

Interview Six

Date of Interview: 13th January 2004
Date of Indexing: 10th September 2005
Interviewee: Head Information Systems
Ministry of National Economy www.moneoman.gov.om/

E-government / E-commerce Plans and Strategies

- E-government is not restricted to offering electronic services to people but most importantly involves simplifying or re-engineering processes, enforcing accountability and setting in place the legislation necessary to protect people's rights.

E-government / E-commerce Accomplishments

> *E-government initiatives in Oman are good and have been developed in the right time. Despite this, proper legislations are not present yet and this can not be seen as a barrier for the short term but will have an affect in the long run.*

Issues in E-government Adoption and Dissemination

> *We need to set legislations and increase IT awareness in the society for benefits in the long term.*

- Services to be offered online should be selected carefully as not all services are suitable or would be widely used. For example, despite the high adoption rate for using ATM machines, only very few people are using them to deposit cash.

> *Our citizens are ready for e-government. Despite this, e-government in general will only target certain segments of the society (those with good level of education and income).*
>
> *E-government should be directed to serve the need of all segments of the society in the short and long terms, and it should be geared to simplify the processes rather than simulating them.*

- When considering e-payments, many options must be provided to meet the capabilities and needs of the majority of people. Initially, one or two options could be offered with a clear indication to users that other channels will follow soon. This will help to enhance user trust, especially for those who are unable to use the initial options (i.e. the government is working to meet their needs and capabilities).
- Mistrust will be minimised by continuous awareness campaigns. The current marketing campaigns are scarce and inadequate and more effort is needed to inform people about the presence and benefits of e-government initiatives.

> *E-government started on the right foot and is progressing fine in Oman. The main struggle is to keep the efforts going and develop an independent entity to take care of the whole e-government and e-Oman project.*

- Employees who will be replaced by e-government services could be trained for other jobs.
- E-services should be focused upon customers' needs rather than the organisation's needs. The channels to utilise online services (internet, computer, application, and processing fees) must be affordable and within the budget of normal citizens.
- The main issue with e-government development is building services around customer needs. Enhancing people's IT awareness is another vital step but marketing efforts are still inadequate. Education and training will certainly promote e-government, but processes need to be re-engineered and proper legislation promulgated.

> *From the time we see a responsible entity established that works actively to achieve e-Oman, we'll need 10 years to develop a decent e-government.*

Interview Seven

Date of Interview: 14th January 2004
Date of Indexing: 11th April 2004
Interviewee: Head Information Systems Department
Ministry of Finance www.mof.gov.om/english/

E-government / E-commerce Plans and Strategies

- The main IT vision in Oman is not only about e-government but rather about achieving a digital society ("information society") that involves e-government, e-governance (legislation), and e-citizens or e-society as a whole. In this respect, the main focus should be on achieving an electronic-enabled society (awareness and knowledge) in which e-government would be a component of this overall target.
- The main objective behind considering IT in public organisations is cutting distance and time by utilising the internet. Most importantly, such initiatives must be cheaper and more convenient for users than face-to-face interactions.
- ICDL is a UNISCO approved program that aims to enhance people's knowledge and awareness of IT. It will be slowly introduced to government employees and later on, it will be a must for any form of employment.
- Different ministries currently have their own silos of information (functional applications and networks). Each ministry works and develops its own infrastructure independently. Such systems should be reassessed and interconnected in order to achieve a comprehensive e-government. This would be achieved by building a gateway or a portal in front of all these silos, and middleware that connects both ends.

> *The services that have the most impacts on citizens and companies will be introduced first to achieve positive first impression. Another criteria to which services will be selected to be offered to the general public is how cost-effective and fast implemented they are. Later, services will be added according to each business case (functional areas). Most importantly, it is an evolving plan where services will be introduced gradually according to how users' awareness, capabilities and needs progresses.*

E-government / E-commerce Accomplishments

- The Ministry of Education is introducing computer labs and courses to students at the secondary level. There are plans also to introduce these courses at the primary level (preparing future generations).

Issues in E-government Adoption and Dissemination

- E-government faces technical and non-technical issues such as online legislation, culture and demographics. Users must be able to afford using the electronic means in terms of awareness, knowledge and cost.

> *The more entrenched legacy systems in the form of silos we have, the more difficult it is to achieve coordination and integration between different ministries.*

- This is due to the following reasons:
  - IT departments and private companies responsible for maintaining the legacy systems will likely resist such integration that will override or erase the legacy systems.
  - It is very costly to demolish such huge silo systems

  The solution is to have middleware systems that can talk both ways to the new portal exchange (government nervous system) system and old legacy ones, and to ask developing companies or IT department to link the developed silo systems to the new exchange.

- Citizens are intended to interact with the portal directly or through service bureaus, internet cafés or other public kiosks.
- The main objective of e-government is to meet users' needs rather than the functional unit it represents.

  Fortunately, Oman doesn't have large entrenched legacy systems, only small few ones. In addition, currently the government is working on the needed infrastructure to develop a main exchange, e-payment, security, internet connection, and common network.

  Transparency is one of the main advantages of e-government and a possible hindrance also. It is difficult for computers to differentiate between users, a feature that might not make some happy.

  Marketing is low. The support from leadership is the most important factor of all. If IT vision is not within the top priorities or not seen as main contributor to an advanced economy (knowledge-based economy)*, many vital initiatives such as IT education will be delayed.*

  Information technology kills three jobs and creates ten others. By retraining idle employees we can overcome unemployment caused by e-government. In addition, moving into an IT based economy is a must not an option. In an aim to attract foreign investment, developing such visions and strategies to enhance and build our ICT sector is a must and should be done very fast.

- The resolution of trust issues needs time, marketing and established laws supported by government leadership. The government needs to be proactive in this situation and act before any concern becomes critical.

  Omanis are highly adaptable to change and accept changes quickly. Plus, nothing technical about using e-government, it is all logical. It is very important to contain Omanis expectations, as they might think it could be done overnight or in a short time.

  Culture should not be seen as a possible barrier and inhibitor to change but instead, change should be examined to be a factor that might negatively affect our culture (i.e. importing foreign values and norms that contradict Omani religious and cultural beliefs)..

  We need at least 5 to 10 years to finish the early planned steps because developing infrastructure needs time. There are plans to speed up the provision of online services by marketing and promoting competition through prizes and rewards.

Creating e-Oman and e-government aim to create more opportunities to the private sector to earn a competitive edge by performing citizens' tasks on their behalf by establishing the proper links with the government. For example, an insurance company could seek authorisation from ROP to renew driving licenses and / or car registrations on behalf of the customers. This will make the government more like a regulator of the services, rather than a provider and makes the private sector become more active and competitive.

Interview Eight

Date of Interview: 15th January 2004
Date of Indexing: 16th September 2005
Interviewee: Head of Technical Secretary, Ministry of National Economy (MoNE) www.mof.gov.om/english/

E-government / E-commerce plans and strategies

- The government intends to become the driver that will influence the private sector to be e-enabled and IT oriented, especially when the government adopts new technologies and forces the private sector to utilise electronic means of communication and interaction.
- Early e-government initiatives (quick wins) will be phased in progressively and are expected to take 5 to 10 years for full implementation.
- There are plans to introduce computer labs and courses within primary and secondary schools. Currently, computer labs and courses are offered at the secondary level only. There is also an intention to set ICDL as a minimum requirement for any form of employment in the government sector.

E-government / E-commerce accomplishments

- OmanTel has submitted a quotation for a very sophisticated telecommunication network that covers the whole country and it is being examined now by ITTS. A civil status (national registry) system and one-stop-shop project has been introduced.

  > *Currently the citizens will not see much as the current focus is to complete and develop the needed infrastructure (government nervous system, middleware, portal or a main gateway to government services). Tenders will be issued shortly to start developing these projects.*
  >
  > *People databank is ready through the civil status system which is supported by a multifunction smart ID card. A company databank is currently being developed in a form of shared database system (one-stop shop). Geographical information system (shared database) is also being designed and developed for Oman. A complete architecture is currently being developed with Gartner (called Service Oriented Architecture) that shows the design of such databases and proposed links between them (divided into modules and shared components within a community of interest). This architecture is planned to sit on the new network and use Oman Government Nerval System as a middleware to talk to each other.*

- Knowledge Oasis Muscat is aimed to build Oman's ICT capacity. It has been developed to increase the number of IT-skilled people and IT awareness about ICT's potential in Oman. It also serves to attract local and foreign investment in IT and encourage local young entrepreneurs to incubate their own IT businesses.
- For systems development, there is a plan to use the BOT method (Build Operate Transfer) where companies can finance the building and operation of systems for a certain time before the government takes over. Such projects are expected to cost around OMR40 million.

Issues in E-government Adoption and Dissemination

> *Most IT companies in Oman are currently like brokers where they usually outsource the jobs to an outside IT companies usually from India. KOM aims to incubate real IT businesses.*
>
> *Certain quick-win projects will be developed soon to show real examples of e-government to the public in an aim to increase people's awareness and trust in government initiatives. These were planned to be done last year, but for some infrastructure issues they were delayed and will be implemented this year 2004.*

- All projects are expected to cost millions of Omani Rials but the intention is to outsource the majority of projects in an aim to attract foreign IT investment. Government Network, for example, is planned to be outsourced to OmanTel which will invest in the design, services and infrastructure. This is expected to cost OmanTel about OMR50 million. The government will later pay a fixed fee for the required bandwidth for an agreed period of time, perhaps 10 or 20 years.
- Quick-win projects will cost less as they will use existing legacy or model systems within the ministries. The services provided by each quick-win project involve only those within a single ministry (i.e. no need for integration with other systems from other ministries). They are e-ready which means that a knowledge base (people with appropriate IT knowledge and interest) is available within the ministry.
- Some government entities are more active in e-government than others, mainly because of a high level of e-awareness and IT among the leadership. Other leaders don't trust IT and it should be the role of the ITTS to promote and encourage them to be more IT oriented.
- ITTS aims to mitigate the digital divide between ministries and the various regions of the sultanate.

> *There is currently a telecom law that emphasises the introduction of universal services in Oman which means that OmanTel and any new ICT company must provide ICT services to rural areas according to the conditions of the law.*

- Most of Gartner's e-government recommendations were the result of joint efforts with other local Omani teams (about 15 Omanis were involved).

Interviews Nine & Ten

Note: Interviewees were interviewed at the same time and place.

Date of Interview: 24th January 2004
Date of Indexing: 12th September 2005
Interviewees: Managers responsible for SAP Application and Maintenance
Petroleum Development Oman (PDO) www.pdo.co.om/pdo/

E-government / E-commerce Plans and Strategies

- IT is seen as an important facilitator and contributor to PDO's success. PDO is seeking suitable technologies for its operation, but it is still considered to be lagging in terms of implementing up-to-date systems and applications.
- PDO's IT department takes a long time—as much as one or two years— to examine and investigate the potential of applications and systems before adopting them.

E-government / E-commerce Accomplishments

- Systems Applications and Products (SAP) was introduced in PDO to act as an exchange or hub to link all legacy systems together. The SAP system allows transactions to be viewed by everyone according to their level of authorisation. It reduces the time required for senior management to view daily and monthly reports and transactions (transparency). It also integrates many vital work modules such as logistics, finance, maintenance and inventory into one system. It is anticipated that this system will save the company US$13 million per year if implemented correctly.
- Continuous supervision and on-the-job training were undertaken to promote the adoption of SAP but this is a time-consuming process.
- There are no plans as yet to connect to government organisations electronically. One of many reasons for this is that ministries are not seen to be technically ready. In addition, security and privacy issues (such as the leaking of information to competitors) are still prevalent.

Issues in E-government Adoption and Dissemination

> *IT in Oman was introduced quickly and the users were not culturally ready for it. The majority (about 70%) of internet users were attracted towards the unethical sites at the beginnings. Later when firewalls and proxies were adopted by OmanTel, it witnessed a decline in number of subscribers.* (Jamal)

- The majority of people in Oman lack substantial IT awareness and guidance in its use. They know how to perform generic internet activities such as discussion forums and chatting but they don't know how to access the few e-government initiatives in Oman, such as downloading application forms, for example.

> *Computer prices dropped significantly within the last 10 years. In the past, it cost about OMR1500 for a desktop PC, now it is OMR150 and OMR250 for latest configurations. Some people started to perceive computers as a fashion and part of the house decoration, a notion that*

> *dominated over the very basic uses and benefits of computers. Children think of it as a gaming console only.* (Jamal)

- The government must seek to increase public and government employee awareness not only of its e-government programs but also about the practical uses and benefits of computers.

> *We don't lack money, but we lack proper allocations of funds and prioritisation of projects.* (Khalid)

- Resistance to change is one of the key barriers to adopting new technology. Change is largely perceived as an extra effort that requires some understanding of the new technology.

> *People will resist extra efforts where others simply have the idea "I hate computers" and will resist any interaction with it regardless of its type. Very few people on the other hand might think of it from the health point of view and that using computers might affect their health is some ways.* (Jamal)

- Government ministries have different work layers and hierarchies that affect the extent of computer usage (national factor). Many key staff have one or more secretaries who do the computer work on their behalf and therefore eliminate their need to learn about computers or the internet. Centralisation is another issue, as government ministries usually have a few people who do most of the technical work for the whole organisation.

> *It will only be good when we make computers the responsibility of every one's work in the organisation hierarchy.* (Jamal)

- Unemployment may be a result of any industrial or technological revolution. This issue may well face Oman if it opts for full automation and the adoption of new technologies.
- Security is another concern that may affect the decision of leaders to adopt new technologies.

> *This is present also in PDO as they fear security issues the most, a reason for taking long time to examine systems.* (Khalid)

- The SAP system interacts with all levels of the company. Its users need time to understand and familiarise themselves with it, as opposed to Microsoft's programs that are seen to be more user-friendly. The main difficulties are faced by people with little education and IT background as they used to perform all their tasks manually.

> *People with basic knowledge about computers also struggled in accepting and using the system, mainly because they felt that they don't have the freedom they used to have with the previous manual system. With SAP, their transactions can now be tracked down and monitored by almost everyone in the company (before they can get and order at any amount, now they fear accountability as they can be tracked down by the system).* (Khalid)

- Errors in SAP training caused lower levels of adoption and contributed to an initial perception of SAP as a failure. Such errors included:
  - Training was given to about 2000 people in PDO (about half of the company employees) with little attention to how SAP could benefit them individually

according to their rank. In addition, all SAP utilities were covered, regardless of whether participants would be able (or have the authority) to use them.

- The SAP system is an integrated package but the training programs were segmented into modules or functional areas. This approach failed to highlight the most important advantage of SAP (integration) to users. After a year, users began to learn the links between the different modules although no integrated training course had been given.
- A language barrier was also evident. SAP officials from Germany explained the system to Dutch and Italian trainers in PDO, who then presented the training seminars to Omanis with varying fluency in English.

- OmanTel is seen to be lagging behind in terms of its ICT facilities and services compared with neighboring countries like Dubai in UAE. This perception makes people hesitant and not trustful of any new ICT initiatives (building stereotypes).

> *People should understand the benefits of IT systems before we ask them to use them. Telephone bills for example in Oman only shows the total amount to be paid, where in Dubai detailed phone calls information, duration and cost are displayed. Such comparisons and notions increase people's trust and respect to the service provider. Unfortunately, not many people respect or have trust in OmanTel's services in Oman.* (Jamal)

- IT may sometimes cause time delays if not implemented correctly. For example in Oman, computers were introduced in public clinics where doctors are now required to enter patient information and prescriptions on computers. Patients then take their patient cards to the chemist (located inside the clinic) where prescription information is retrieved from the system by reference to the card number. Most doctors were not trained adequately to type fast; hence they took longer to enter the information than when they used a manual system.

> *In addition, pharmacists didn't make the medicine ready for patients, maybe because the system didn't support this or they lacked proper training. Moreover, clinics and hospitals are not connected yet and since, different clinics and hospitals don't share patients' information making it hard for other doctors to tack down patients' history* (lack of planning and proper implementation and understanding of business operations). *Such efforts might be perceived now as delaying and might cause health dangers to people.* (Jamal)

- E-government needs proper planning and a high level of employee loyalty and goodwill to produce a beneficial system.
- It is very important to increase employees' loyalty by giving encouragement through rewards, incentives, recognition and appreciation of their efforts.
- Computer and internet cost is not seen as a barrier to the adoption of e-government.
- In order to develop trust and reduce their apprehensions, people should be convinced of the level of service offered and the qualifications of those providing the services.

> *Some citizens don't trust the work being done manually in Oman, how would they trust it if it is done electronically from organisations or people seen to be incompetent (like the company collecting money of utilities bills).* (Jamal)

- This may justify the decision some IT professionals not to use the current online systems to pay bills or conduct other online transactions.
- Performing online payments of bills or other online activities must be comprehensive of all related activities or else the services will not be used.

> *If I can pay internet, mobile and home phone bills online but still I'll need to go to pay my water and electricity bills physically, then perhaps I'll do all of them physically and save myself the worry.* (Jamal)

- E-laws are important to increase adoption rates.
- Services should be introduced gradually, leaving the most contentious ones such as making online payments until last.
- There is an obvious lack of marketing of e-government initiatives in Oman and this affects the credibility of government initiatives. People are confused about what has been achieved and what developments are planned for the future.
- Processes needs to be simplified and re-engineered. OmanTel is seen to be lagging in terms of the quality of its ICT services.

> *SEEING is BELIEVING: people see the services are poor and time-consuming, and hear many complaints.* (Jamal)

- A stereotypical view has been formed about the quality of OmanTel's services and that it is lagging behind in terms of IT advancements.
- Government intentions behind developing e-government are also questioned. Is it for the sake of e-government, or to simplify tasks and processes for citizens? This should be clarified for citizens by the commitment of their leaders to implementation and marketing of e-government systems.

> *When we have more people on roads than in offices this might be an indication that e-services is poor since it most likely means that people are going from one office to another to perform transactions.* (Khalid)

- Funding issues may arise because of a recent decline in oil production in Oman. The e-government project may not receive such high priority as other projects pertaining to education, health and transportation.
- Citizens who are unaware of e-government and its benefits are unlikely to complain about the lack of it. They will more likely be concerned about other needs that affect their daily lives, such as education, healthcare and work environment. For example, paving roads to rural areas may be seen as more important than e-government. Increasing healthcare is also more vital in the view of many people.
- The fact that oil revenues are not expected to last forever forces Oman to focus more on short-term plans in which a project like e-government cannot be accommodated.

Interview Eleven

Date of Interview: 4th February 2004
Date of Indexing: 26th April 2004
Interviewee: Head Internet Banking
Bank Muscat (BM) www.bankmuscat.com

E-government / E-commerce Plans and Strategies

- The automation process in any private or public organisation causes decision makers to consider those people who will be replaced by the new system(s). These people can be used more practically by assessing their capability and willingness to work in other areas where they are likely be more productive and useful.

E-government / E-commerce Accomplishments

- Internet banking was launched in 2001 by BM.

> *Despite the current 60,000 internet subscribers in Oman, only 5000 users are subscribed to BM internet banking. This figure has been affected with the level of e-readiness among other institutions and offices. People will be more inclined to use internet banking when it can serve many purposes and is integrated with many other organisations such as travel agencies, governmental ministries and other companies.*

- Security is a very important concern to BM. The bank employed a security consultant firm to develop a comprehensive list of security requirements that need to be built in. BM pays for professional hackers to attempt to hack the bank's site, the aim being to test the vulnerability of the systems. The reports submitted show that only 35% of the systems could be penetrated.
- BM utilises extensive security measures in internet banking. The user needs an ID and two passwords to access the system. One password is used to log the user into the system and the other is used for completing transactions. The two passwords provide security if a user leaves a PC without logging out from internet banking. Verification, authentication and firewalls are used extensively. Users can specify limits for amounts in transfer transactions for their various accounts.

Issues in E-government Adoption and Dissemination

- Large numbers of customers visit Bank Muscat (BM) branches for basic financial transactions like cash withdrawal, despite the enormous spread of ATMs around the sultanate.
- Institutions are somewhat hesitant to go online because they are either not ready (technically, financially, or culturally) or they lack transparency (i.e. don't want/unable to provide crucial information to the wider public).

> *E-commerce and e-government need a comprehensive citizen database but with such lack in transparency, information updating and hesitance to provide accurate information – the task is difficult. In general, the collected information (such as dates of birth, addresses and telephone*

numbers) is not correct or invalid. This leads us to another dilemma: how long we need till we correct this information?

Some government institutions such as Ministry of Commerce and Industry, and Muscat Municipality might have better up-to-date information because clients are asked to renew their contracts or licences annually (i.e. update information). *Others such as the Police and the Immigration Department where you need to renew your passport, ID card, driving license every 5 or 10 years still may suffer from outdated information. People should be geared to update their information regularly whenever a change happens.*

- Transparency, readiness (technically and culturally), complete, accurate and up-to-date information, security, and laws pertaining to e-transactions are critical to any e-system, especially e-government.
- The level of automation or extent of e-service provision should be planned according to the expected level of usage and the requirements of targeted users.

E-government could be developed either full fledge or through different sequential or parallel phases. Ministries have to decide which approach to take according to its current system and capabilities.

Certain number of ministries should first attempt to adopt e-government initiative(s). Later, the citizens' responses should be surveyed for better planning of further e-government implementations. On the other hand, the timeframe of when and how long to adopt certain e-government initiative is vital too. Migration is time-consuming, difficult, and should be carefully planned and executed.

A lot of planning has to be done on rural areas. Cultural issues are most likely to be apparent there. It's a question of how to get people there to accept doing online transactions despite the poor infrastructure, and low level of computer literacy. It might be useful to segregate the people who are most likely not to use e-services and try to encourage them through education, training, marketing and incentives.

- Education and encouragement through incentives are essential to address the cultural barriers.
- Despite the high level of security measures employed by BM, some people still fear using internet banking. These people require more time and marketing and will eventually be convinced to use it, as was the case when ATM machines were first introduced.
- Internet and computer costs are vital factors in IT adoption and their current levels may hinder some people from using online services. This issue must not be allowed to dominate and can be resolved easily with proper planning. Internet café and service bureaus can offer a solution, but they should be flexible in their times of operation, services, locations and proximity to potential users. In addition, ministries could provide, share, or install in their premises public PCs that can be used to perform online activities with the ministry itself.
- Banks depend on government and vice-versa, especially for payment purposes. Physical cash transactions are risky and require extensive controls and security measures. There is always a possibility of losing cash during transactions through

human error and/or other physical hazards. Online cashless transactions involve less risk if the system is planned and designed very well.

- Oman's move towards becoming an advanced digital society is slow due to poor infrastructure, technology prices, the incompatibility between different systems in various entities, too little attention being paid to developing user-friendly interfaces, and the current public perception of IT.

Interview Twelve

Date of Interview: 5th February 2004
Date of Indexing: 15th September 2005
Interviewee: Head of E-commerce Division
Oman TradaNet LLC (OTN) www.otn.com.om/

E-government / E-commerce Plans and Strategies

- OTN specialises mainly in real time supply chain management and document transfer (e-document) B2B solutions over secure lines in the internet (iX2 portal). It is the major producer and user of such applications.

E-government / E-commerce Accomplishments

- OTN has developed virtual tender box and online payments applications that are ready to be launched as soon as the proper infrastructure is available. OTN has many IT initiatives to offer but is limited by the current level of infrastructure in Oman.

> *There is a limit to what we can do and we progress as the government progresses in ICT.*

Issues in E-government Adoption and Dissemination

- Lack of proper legislation renders all e-documents unofficial in the view of government officials. This has inhibited the public sector from adopting such applications as e-documents do not yet have legal and official status.
- Many problems were faced when introducing the iX2 system. Resistance to change was a major factor. On the other hand, the urgent need for such an application drives demand and creates an environment for its adoption. This was the case for the Petroleum Development Oman (PDO) procurement department which used to receive about 2000 documents daily, all of which needed to be followed up and tracked throughout the company. This forced the company to utilise the iX2 system.

> *OmanTel's current poor services are a major obstacle towards IT adoption and dissemination in Oman. Any internet-based application such as the iX2 is highly affected by how slow and inconvenient the internet connection in Oman is. From our side, OTN upgraded its internet connection and databases to provider faster response to users' requests. From the users' side, their internet connection speed might sometimes results of complaints, which is again OmanTel's fault.*

- Many IT initiatives have few clear short-term benefits, a factor that may have a negative influence on decision makers, especially those with little or no IT knowledge.

> *OmanTel is working hard to adopt and deploy state-of-the-art technologies and hardware but a main key factor that inhibits its success is the lack of IT-skilled, knowledgeable staff.*

- The real intentions and objectives behind e-government implementation may have a great influence on how useful it is going to be to the general public.

  > *One possible perceived drawback to e-government is lack of interaction with real people. People who used to do things through contacts in public departments won't have that luxury any more. Transparency would be perceived as an inhibitor by some key decision makers.*
  >
  > *E-payment options should be planed according to users' level of IT knowledge and capabilities. Credit cards should target those who are e-commerce literate, other means like smart card, kiosks or over the counter payments should target those with little or no IT experience and older citizens.*

- The main point is to provide several options to users to make payments and try to cover all needs and capabilities of users.
- The development of IT infrastructure in Oman needs urgent attention.
- E-government plans and efforts in Oman are very much under-marketed:

  > *I'm in this field and still have not heard about e-government in Oman.*

- Education and offering incentives for users to go online are very important to drive the success of e-government in Oman.

  > *The limited internet bandwidth in Oman makes OmanTel try to balance the number of internet subscribers with the number of hours they spend on the Internet (because they can only handle certain number at a time). This is possibly the reason behind the hourly cost scheme adopted by OmanTel. They can not simply accommodate all subscribers at the same time in aim to avoid internet bottlenecks as well".*
  >
  > *Internet access fees would be reduced sooner or later but as far as computer prices; there is little chance they will drop significantly unless the government and some private organisations subsidise them to poor families. Another option is to provide public kiosks or booths to be used by the general public.*

- The younger generation is potentially more likely to adopt and use IT technologies and applications.
- Many citizens in advanced nations like the UK and USA tend not to trust programs or projects initiated by their government. This trend would be expected also in any IT-based application such as e-government.

  > *First question to ask before introducing IT applications in Oman is: Are people capable of using it? Second will be: Are they willing to use it?*

- Time is crucial for people to absorb new technologies. Companies and government should be prepared to cope with complaints in the early stages until users get used to the new system.
- E-laws are crucial to build people's trust and encourage IT developers to produce more e-applications.
- ICT services in Oman are advancing very slowly, mainly because the current infrastructure (laws, network, and security) is not adequate.

  > *Oman needs at least 20 years to be fully e-enabled with good society e-readiness, IT awareness and knowledge.*

Interview Thirteen

Date of Interview: 3rd March 2004
Date of Indexing: 18th May 2004
Interviewee: Under Secretary for Commerce and Industry
Ministry of Commerce and Industry (MoCE)
http://www.mocioman.gov.om/

E-government / E-commerce Plans and Strategies

- MoCE has initiated an e-government "one-stop-shop" project for company registrations. It will involve hardware, software and even some physical developments. Part of MoCE's premises will be modified to facilitate this initiative.
- MoCE intends to open offices called "Sanad" in rural areas. The offices will act as agents for several Omani government ministries. People can access these offices in their own rural areas to conduct transactions with the government and will no longer need to report in person to the capital city of Muscat to conduct these transactions. The Sanad offices will be fully or partially subsidised by the participating ministries. This will help people in remote areas to save time, effort and cost when conducting transactions with the government.

E-government / E-commerce Accomplishments

- There are many aspects of the national IT strategy in Oman:
  - Establishing laws and legislations governing e-transactions: In this regard, a tender was issued in February 2003 inviting specialist law companies with IT experts to bid on the development of appropriate online e-laws for Oman. The Arab countries generally lack such laws; therefore, Oman is expected to use a standard set of e-laws established by the United Nations.

    Proposals were to be lodged after two weeks from the announcement of the tender. Once a company was selected, it would be given three months to develop a comprehensive set of e-laws covering all online activities, to be discussed with the Ministry of Legal Affairs and translated into Arabic. Once finished, the new version will be adopted by organisations in Oman and may require minor amendments to the current laws and regulations.

  - Training and rehabilitation: In this regard, it is planned that public organisations will offer IT training to their employees and the general public. Many private IT colleges have been established and encouraged to offer IT degrees and training to residents. The Ministry of Higher Education is sponsoring many students to join these private IT colleges, while the Ministry of Manpower has established training programs for secondary school graduates to qualify them for the jobs they seek.
  - Encouraging and supporting the private sector to invest in and utilise IT in their work: MoCE utilises OAB smart cards for payment purposes. Petroleum Development Oman, a giant oil company of which the government is a majority owner, has contracted many local IT companies to establish e-bidding and e-procurement systems.

  - Enhancing IT infrastructure: The government plans to invest heavily to improve the current telecommunication infrastructure. The first investment was to develop the Knowledge Oasis Muscat (KOM), an IT park established to serve two purposes. The first is to develop and provide communication services for low prices, which will help to establish low-cost call centers and provide more jobs for Omani youth. Its second purpose is to incubate new IT companies through a range of incentives and facilities.
- A complete one-stop-shop system was to be developed by the end of 2004 and supplemented by a new digital initiative from ROP, "smart ID cards and civil status system". By these means, clients will not be required to produce copies of IDs and passports; instead information will be gathered from ROP's new system. A service agreement will be signed between the Ministry of Commerce and Industry Customer Services Division and other ministries to enable access to client information under certain conditions.
- OMR1,200,000 (equivalent to US$3.2 million) is the estimated cost for the first phase of the one-stop shop. That includes PCs, software, maintenance, networks among other things and involves a total revamp of the current system.
- The Ministry of Commerce and Industry transacts electronically with the Ministry of Finance in regard to financial issues; with the Ministry of Civil Services in regard to administrative issues such as employment, dismissals and promotions; and with other ministries through the one-stop shop.

Issues in E-government Adoption and Dissemination

> *The absence of adequate e-laws might hinder the private companies from going online but the government encourages them to try to secure their own systems by solid security means such as proper gateways and PKI. They were advised not to wait till proper laws are adopted.*
>
> *E-government is not about hardware and software only it is about people. How would you convince a ministry to get red of its forms, cheque system and the routine manual clerical systems? We preferred to bring representatives from all involved government units (Royal Oman Police, Civil Defense, Muscat Municipality, Ministry of Manpower and Ministry of Regional Municipalities, Environment and Water Resources) to help in establishing the one-stop-shop system. The idea is to make them suffer at first from the current incompatibilities and subsequently will be convinced to switch to the online system when it's ready. Currently, these different entities have different forms and procedures. The new system will unify this issue and will make all units talk to each other. You'll have to submit only one electronic form and get feedback electronically.*

- One hurdle facing e-government is the perception that it is associated with loss of jobs. People may think they will lose their jobs or their power in a shift to e-government.
- Adopting e-systems may cause some people to be made redundant and they will require re-training. This issue is overlooked by many ministries and there is a lack of adequate budgeting to re-train personnel.

> *The leaders of change are vital to IT adoption and dissemination, and in Oman, we can classify these into:*

  - *Self-triggered who has IT background, the interest to adopt and the tools. These will be leading their organisation ahead from the others in terms of embracing IT in their work.*
  - *Those who have interest but don't have the tool. They will take time to adopt.*
  - *Those who don't have an interest or a tool. They will be left behind and will require training and rehabilitation.*

- Leadership support and interest in IT is vital. It affects the amount of budget allocated for IT adoption in each organisation.

  Budgets cannot be allocated lavishly to increase the IT awareness for all people. Some governmental institutions have good budget with top officials' commitments to IT, others are bit poor in budget allocation to IT and some ministries like ROP cannot afford not to be IT driven.

  Any new change in the world like e-government needs time to be fully grasped and adopted. This is a human nature; it has nothing to do with Oman or any other country's culture.

  Trust and fears are influenced by things we know and things we don't. We should be enlightened and trained about things we do not know in order for us to trust them.

- Language is an explicit barrier to any e-systems in Oman and the Arabic-speaking countries. This is apparent currently in the e-banking systems in Oman where interfaces are displayed in English only. Record-keeping is another important part of any e-transactions, which should be emphasised. Users should know how to Cut, Paste and Save receipts and summaries of transactions for later reference.
- Oman's e-initiatives suffer from a lack of publicity and marketing campaigns. Not many officials understand the importance of such tools in spreading IT awareness.

  There will always be a digital divide, people not willing or not capable of performing online transactions. Digital divide in a since is not a problem if we know how to live with it.

  It is very important to give the online users added benefits over those using routine channels. At the same time, the others should not be penalised harshly for using the manual systems such as high fees and inflexible working hours. The idea is to offer the services online and keep your physical offerings at low scale.

  Digital transactions eliminate feelings and subjective issues, which sometimes are important. We cannot live in a virtual society; a part of it has to be real. There are some instances when a client needs to describe a situation in order to be served accordingly. In such examples, automation is very difficult. Therefore, we'll never have a full e-government. 80% of the services can be achieved online in 5 years time; anything beyond that might take more times or can not simply be automated.