

**AN EMPIRICAL EXAMINATION
OF THE IMPACT OF ICT ON THE
FUNCTIONING OF THE
LEBANESE MINISTRY OF
FINANCE**

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AN EMPIRICAL EXAMINATION OF THE IMPACT OF ICT ON THE
FUNCTIONING OF THE LEBANESE MINISTRY OF FINANCE

By

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ABSTRACT

This study attempts to obtain a holistic view of ICT application and its impact in the context of a developing economy taking the Lebanese Ministry of Finance as a case study. It draws on the works of Heeks and Stanforth (2007) and Tseng (2008) for the pre-deployment phase of the e-Gov application and the post-implementation phase respectively. Heeks and Stanforth used actor network theory to study the trajectory taken by the Sri Lankan e-Gov project, while Tseng used a form of Structuration theory known as Orlikowski's Model of Technology to gauge the impact of an Electronic Government Information System (EGIS) on the Taiwanese Ministry employees.

To the knowledge of the researcher the chosen research site has never been investigated before. This necessitated that the design phase of the study needed to be assessed first in order to get in-depth information about the contingent and local contextual factors and to ascertain the level of progress in the design and deployment of the ICT tools and techniques. For the post-implementation phase, this longitudinal study assessed the perceived effectiveness of the ICT impact on the end users - the employees. In addition, secondary data collected from the Ministry and the International Monetary Fund was used to corroborate the research.

The study found that the use of 'trajectory mapping' was a crucial tool for investigating the initial ICT adoption process. This is due to its strength in exposing contextual factors, its ability to identify social and technical determinism at different stages of the investigation and its suitability in revealing political wrangling and identifying the dynamism of power in a public institution. The study's findings also reveal the presence of both

technical determinism and social determinism throughout the project, restructuring of the organisation due to the introduction of an ICT unit and job redesign in the whole MoF. The study also found out that ICT resulted in a power shift within the organisation by having the IT unit gain power due to its ICT knowledge. The investigation, however, could not find a direct relationship between the 'degree of success' end point suggested by Heeks and Stanforth (2007) and the sought benefits from the ICT impact. In other words, the proposed 'degree of success' may only explain the design aspect of the EGIS, however, this study found that success or demise depends also on the implementation process and the preparedness of citizens to receive such IT services. Furthermore, the study was able to empirically investigate the applicability of the three layered model suggested by Omoteso et al. (2007) and found out that considering contingency as dynamic is more applicable than the static contingency proposed in the model.

The study realised that there is a great need for a continuous, contemporary training process in the ever-changing ICT environment in order to achieve uninterrupted positive results. Finally, the study indicates that lack of vertical communication, as observed in the Lebanese public institution, between users, ICT designers, and decision makers weaken the whole change process. Therefore, it suggests a form of knowledge management application using ICT as the main venue, a transition from the current mechanistic (bureaucratic) structure to an organic (flat) structure.

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CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.0: Background

Information and communication technologies (ICT) are changing the shape of business as it was once known. There are many definitions for ICT. However, for practical purposes, this study adopted the explanation by Gupta et al. (2008) when they defined ICT as: “technologies such as the Internet, Intranets, Extranets, ERP (Enterprise Resource Planning) and other technologies that cover the spectrum from basic infrastructure implementations to technologies that improve services and operations in an organisation”, (P. 40) . The impact of such technologies is felt in all spectrums of industries from small, the midsize, to large companies (Keil et al. 2001). With the migration towards urban centres in the developing world, cities are getting bigger and municipal and public servants’ work is growing at a chaotic speed (Madon et al. 2004). This expansion of cities and the heavy work-load on government workers favoured the idea of introducing ICTs to speed up the work process, automate procedures and modernise public administration (Madon et al. 2004).

ICTs promised many benefits to all companies, albeit private or public, when used. In the early 1980’s, and with the advancement of semi-conductor technologies, the developed world’s organisations worked on jumping onto the ICT bandwagon early on. The work-flow became mechanised, paperless work process followed, ICT departments within companies established, ICT maintenance services became warranted, and many new electronic business

(e-business) tactics evolved. Organisations saw a lucrative economic future by investing in ICT. The belief was, by adopting ICTs in the organisation, there will be an improvement in the work process, major cuts in cost, enhancement in quality, and higher productivity (Legris and Collette 2006).

Similarly, the early 1990's witnessed the ICT utilisation and computer usage by the developing world public organisations, and Electronic Government Information System (EGIS) and e-government projects (e-Gov) ensued (Stanforth 2006, Heeks and Stanforth 2007, Tseng 2008). With governments and their mega-organisations, lots of stakeholders joined the ICT mediated process. The advancement in communication by utilising ICTs and the Electronic Service Delivery (ESD) to citizens made a drastic impact on people, societies, organisations, governments, and the world as a whole (Tseng 2008).

Organisational practitioners, consultants, and business developers try to benefit from the impact of ICT, yet the effort mostly produced unsatisfying and disappointing results (Burnes 2000). In the 1990's and at the turn of the century, some businesses adopted some very promising and expensive software packages, namely Business Process Re-Engineering (BPR), and Enterprise Resource Planning (ERP) (Furumo and Melchor 2006). These two 'ICT management tools' rejuvenated the organisation holistically causing great financial costs on organisations and changed the employees' work flow process. However, failure rate in implementation was still high (Furumo and Melchor 2006). The fierce competition among organisations and the demand for high effectiveness and efficiency warranted a successful adaptation of

ICT systems. A failed ERP or BPR, with their high financial burdens, could be catastrophic for any organisation.

At this stage of the discussion, it will be necessary to make a distinction between a project and a programme with a view to understanding failures or successes relating to the two concepts. As defined by LeRoy (2008): "A project is a temporary undertaking to create a unique product or service. A project has a defined start and end point and specific objectives that, when attained, signify completion. A programme, on the other hand, is defined as a group of related projects managed in a coordinated way to obtain benefits not available from managing the projects individually. A programme is comprised of multiple projects and is created to obtain broad organizational or technical objectives. There are many differences between a project and a programme; one notable difference is time. A project by definition has a beginning and an end; certain programmes, while having a beginning may not have an end". Although the notion of success or failure is not a primary concern of this effort, however, in looking at ICT impact, the term desired benefits or impact refers to the overall programme success or organisation success. This includes positive impact on revenue generation, ease of work flow, reduced workloads, better decision making, reduction of paperwork, speed of transactions, accuracy, among others.

Technology became a necessity in communication; Governments, trying to reform the public administration, acknowledged its essence (Tseng 2008). E-Gov was seen as a positive technological change and a good enhancement in organisational and administrative issues (Heeks and Stanforth 2007). This need for ICT applications became essential in organisations as summarised by Spanos et al. (2002):

'ICT has come to constitute the basis of economic development both at the macro and micro levels, and hence those actors that fail to participate in such developments risk increasing marginalisation', (p. 659).

Yet, despite how ingrained ICT was in organisations, the theoretical understanding of the ICT mediated process of organising was, and still is, in its early stages.

1.1.0: Developments and Related Issues in ICT Impact

The current body of literature reveals different perspectives on introduction of ICT within organizations. Some studies were conducted to ascertain the design of ICT tools and techniques and the conditions that must go with it for proper implementation. Other studies were concerned with the effect of the proposed ICT solutions on the users of such technologies. In other words, the pre-deployment and the post implementation have been the predominant focus of most of the studies. Holistic studies that encompass the organisational adoption of ICT Systems, including motivation for change, design, implementation, impact, and resultant further developments, appears to have received little attention.

Theoretically, there is an unending debate between social determinism and technical determinism schools in attempting to explain the human-machine relationship. However, the Socio-Technical System theory had surfaced as a middle ground (Azad and Faraj 2009). Contingency theory and Structuration theory on the other hand, has been used extensively in ICT related studies and were found to be able to explain several pre and post implementation issues (Orlikowski 1992). Furthermore, the combination of theories in large

projects was also seen as new but forthcoming in ICT impact investigations (Omoteso et al. 2007). In the last decade, however, Actor Network Theory (ANT), following the Socio-Technical Systems school of thought, has been the choice of many researchers, who have used its constructs in different situations (Sarker et al. 2006). Most notable, from the viewpoint of this study, was the work of Heeks and Stanforth (2007) that used the global and local network construct from ANT to investigate a pre-implementation e-Government project in the Sri Lankan Ministry of Finance, mapping out the trajectory taken by the e-Government project. A similar approach of using the ANT construct prior to the work of Heeks and Stanforth (2007) has been taken by Law and Callon (1992) and Gasson (2006) for smaller technology projects. Recently, however, realising the benefits of this framework, articles started flourishing using Heeks and Stanforth's (2007) approach, such as the works of Muganda-Ocahara and Van Belle (2008), Ruikar and Chang (2012), and Strong and Letch (2012).

The current study, drawing inspiration from previous studies, attempts to obtain a holistic view of ICT application and its impact on a public organisation, at the least in the context of developing economies, taking the Ministry of Finance of Lebanon as a case study. The study, heeding the calls to use a framework of multi-stage multi-theory in investigating large projects suggested by Omoteso et al. (2007), based the investigation on Heeks and Stanforth (2007) for the pre-deployment phase of the e-Gov application and Tseng (2008) for the post-implementation phase. Heeks and Stanforth, as mentioned earlier, used the global and local network construct of ANT, as their theoretical underpinning for studying the trajectory taken by the Sri Lankan e-Gov project, while Tseng used a form of Giddens' Structuration theory known as Orlikowski's Model of Technology developed in 1992, to

gauge the impact of an Electronic Government Information System (EGIS) on the Taiwanese Ministry employees.

To the knowledge of the researcher, and as asserted by the Lebanese officials, the chosen research site has never been investigated before. This necessitated that the design phase was to be assessed first to get in-depth information about the contingent and local contextual factors and to ascertain the level of progress in the design and deployment of the ICT tools and techniques. In addition, the initial phase of the research came across the political influence, budgetary constraints, institutional problems, ICT cognition issues and networks alignment issues - requiring a thorough longitudinal study. For the post implementation phase, the study ascertained the perceived effectiveness of the ICT impact on the end users: the employees. Finally, secondary data collected from the Ministry and the International Monetary Fund, were used to corroborate the output from both phases of the research.

The rest of this chapter outlines the aims of the study and the humble contribution sought towards understanding the impact and Electronic-Government projects, empowered by ICTs, on the function of organisations.

1.2.0: The Research Aim

The adoption of e-Gov took a fast pace in late 1990's (Gronlund and Horan 2004). Many governments worldwide were experiencing difficulties in handling large volume of transactions (Madon et al. 2004). Thus, Finance Ministries were the pioneers in attracting the e-Gov projects to relieve the workload (Madon et al. 2004). Since collecting taxes (Income Tax, Value

Added Tax 'VAT', Property Tax, among others) is the backbone of finances in governments, the need for accuracy, speed, and real-time figures was needed. Costly e-Gov projects promised lucrative return on the investment, yet the e-Gov adoption failure rate was observed to be fairly high; where some e-Gov literature put failure rates at 60% and even up to 85% (Heeks 2002).

After the civil war that ended in 1992, the Lebanese government decided to leapfrog into e-Government. From 1993, and still ongoing, a programme was started to automate the government as a whole. The Ministry of Finance was the pioneer or the pilot for this effort. According to Lebanese officials interviewed, there hasn't been any academic work focused on the Lebanese e-government since the start of the programme and there is a will to allow an academic investigation to occur. The political wrangling in Lebanon between pro and anti-automation is still ongoing. Assessing the benefits of such an IT programme in the Lebanese setting made the study intriguing due to the power struggle, the instability, the wars during implementation, the change of governments and opposing faction to the programme. The ability of the researcher, being from the area, made the research site accessible. The concentration on the MoF was simply due to the fact that it was marked by the Lebanese officials as the jewel of the e-Government effort.

Several researches were conducted in e-Gov projects. However, frameworks appeared recently calling for a new method in ICT impact studies. For example, combining theories and using them as a guide in different stages of a big project was suggested by Omoteso et al. (2007). Similarly, Heeks and Stanforth (2007) used a new framework in the analysis of an

information system project in the country of Sri Lanka. The authors utilised the 'local and global network' construct from Actor Network Theory (ANT) in their study of the Sri Lanka's EGIS. The local and global network construct adheres to the idea that 'positive outcome from an EGIS programme occurs when the EGIS is considered as an obligatory point of passage between local and global network of actors who represent the stakeholders of the programme. The frameworks suggested have not been empirically checked due to the fact that they were in their early stages. Further research in combining theories and the use of Heeks and Stanforth's (2007) framework was deemed as worthy of additional investigation by the author in the Lebanese e-Gov programme at hand.

The aim of this study is to primarily investigate the impact of an Electronic Government Information System (EGIS) Programme on the Lebanese Ministry of Finance (MoF). An EGIS has multiple uses and affects several stakeholders with different interests. However, for sake of simplicity and to manage the boundaries and scope, EGIS is treated in this research effort as a homogeneous 'single' system. Notwithstanding, the impact of this programme was gauged in regards to the impact on tax administration workflow automation, revenue generation, inter-organisational power shifts, internal and external communication, and structures within the organisation. In addition, and from a theoretical perspective in studying ICT impact, the aim was extended to check the viability of the novel method used by Heeks and Stanforth (2007). Furthermore, this study also aimed at empirically investigating the three-layered model suggested by Omoteso et al. (2007).

1.3.0: Main Objectives of the Study

Putting the research aim into perspective, and after identifying gaps in the literature as discussed in chapter two of this research, the following objectives were identified:

- i. To investigate the trajectory of the Electronic Government effort in the Revenue Department of the Lebanese Ministry of Finance (MoF) in the context of an under-developed economy.
- ii. To assess the employees' perceived effectiveness of EGIS programme on the functioning of the public organisation.
- iii. To check the relationship between the degree of success of the trajectory taken by an EGIS and the employees' perceived effectiveness on the functioning of the Lebanese MoF.
- iv. To gauge the impact of EGIS programme on revenue collection.
- v. To empirically check the applicability of multi-theory models as appropriate theoretical framework in studying ICT projects.

1.4.0: Scope of the Study

This research investigated holistically the embedding of ICT in a public organisation by studying the trajectory taken by an e-Gov project and then assessed the perceived effectiveness of such a project through empirical methods. The study covered the activities of both external (donors and programs, vendors and suppliers) and internal networks' players (local officials, politicians, and employees) of the ICT project deployed in the revenue Department of the Lebanese Ministry of Finance. The research covered the three significant offices in the cities of Tripoli, Mount Lebanon, and Beirut. The three major provinces, out of five, were selected because

the other two IT established branches in the Ministry offices were too small to change any results of the survey conducted as directed by the director of the Finance Ministry. A total of 495 participants in the internal network, and 21 in the external network, were involved in the research.

1.5.0: Significance of the Study

The idea of conducting a study, as such, in a country like Lebanon was based on its potential contribution to the field of comparative institutional/ cultural/ technological analysis of public organisations. Throughout the literature review of this research, ICT impact holistic studies received very little attention. Therefore, the relationship between the inception of an EGIS and its effects after implementation in a public organisation in the third world country was sought after. Trajectory of an EGIS, as a novel tool, has not been tested for its relation with the perceived effectiveness of such effort. A lack of past empirical studies, in this part of the world, has resulted in minimal academic literature being available to any researcher. This study is a small contribution to try to help in filling this gap.

The study empirically investigated the appropriateness of the novel framework of global and local network construct of ANT used earlier by Law and Callon (1992) and recently by Gasson (2006), Heeks and Stanforth (2007), Muganda-Ocahra and Van Belle (2008), Strong and Letch (2012), and Ruikar and Chang (2012). In addition, the study suggested the viability for the use of multi-phase, multi-methodology, and complementary investigations in large projects such as e-Gov projects. The 'multi' allowed for a holistic view and conceptualization of the ICT impact on the functioning of the revenue administration.

Furthermore, the study, in contrast with findings of Heeks and Stanforth, detected social and technical determinism at different stages of the research, hinting to the intermixing of both. That determinism was, mostly, in an always continuous wrangling with two entities from the ANT vocabulary, namely: 'power to' and 'power over'. These two terms were simplified and empirically ascertained regarding possession of power at different times (refer to chapter 4).

The research could also be useful in identifying other areas for further research. It is also hoped that readers of the research will be able to broaden their insight of how to look at trajectories of projects rather than a snapshot or separate frames of the project implementation (Azad and Faraj 2008). It might help to validate suggested and discovered theoretical models in similar settings. Finally, the case study researched, being thorough, could be beneficial for both the public and the private sector organisations.

1.6.0: Conclusion

This chapter introduced the topic discussed in this research, the impact of ICT on the functioning of the Lebanese Ministry of Finance. It provided the background of the subject and discussed the aims, objectives, scope, and significance of the research. The following chapter, chapter two, has the literature review and relevant frameworks and theories adopted by the research, the research gaps identified; part of which this work intends to address through its research questions. In the rest of the thesis, the research methodology adopted is found in chapter three; chapter four contains the data collection procedures from the different networks involved

in the research and the qualitative data analysis. Chapter five includes the data analysis and discussion of the results obtained from the quantitative phase of the research. Chapter six, contains the discussion of the findings from chapters four and five. Finally, chapter seven covers the summary of the results and the future direction in this research area.

CHAPTER TWO

A REVIEW OF LITERATURE AND THEORIES

2.0: Introduction

This study introduced the subject matter and briefly provided an overview of how the study was conducted. This chapter expands the relevant themes and introduces the importance of the revenue department in Finance Ministries in governments. The chapter goes further by exploring the different actor networks involved in an Electronic Government Information System (EGIS), the ICT management readiness to exploit the full benefit of an EGIS, and the effect of institutional practice on the ICT project realisation.

It then provides an overview of frameworks and theories used in the literature to conceptualise the phenomenon and the selected framework for this study. ANT, Actor Network Theory, and Structuration theory are explained in details and the reason behind choosing such theories. The chapter directs the reader's attention to the benefit sought from studying the trajectory of the EGIS and the ability to identify the contextual factors involved to ease the impact of introducing ICTs in public organisations. Finally, the chapter exposes the gaps detected in the literature and discusses the research goals and how the propositions were identified from the literature.

2.1.0: Modernisation in the Revenue Department

The need to reduce the tax gap (actual tax – collected tax) pushed researchers and practitioners to look for ways to modernise the Tax

Administration (TA) using ICTs as tools for the process. This started at an early time in the developed world and promised a fast fix for the tax gap problem. However, studies found that the magic fix has eluded most governments who are still in the process of finding ways and methods to improve the performance in the TA departments (Branham 2009).

The modernisation process and the use of ICTs empowered systems started gradually in the last century by many developed countries and is an ongoing process. As such, the developing world realised the need for such modernisation and is rapidly catching up (O'Donnell et al. 1999; Moon 2003; Gichoya 2005; Fedorowicz and Dias 2010). Modernisation promised to improve revenue generation, allow customer oriented activities and service delivery, reduce corruption and increase transparency and develop employees' skills level and increase their involvement in the decision making process, therefore, improving the overall performance of tax administration.

In the mid 1960's the US, Canada, and Australia were among the 'Organisation for Economic Co-Operation and Development' (OECD), industrialised countries that heavily invested in the ICTs' which enabled modernisation of TA functions. For example, the modernisation of the Australian Taxation Office (ATO) started as early as 1966 by introducing computers to replace the large paper work process. Cyber 72 main frame configuration was used in 1972 where a Pay-as-You-Earn (PAYE) system (allowing third party tax withholding) went into effect. In 1976 The National Taxpayer System (NTS) was implemented and was considered a world leading example in modernisation (Segal et al. 1994). Australia's TA (ATO) has currently an ongoing process of analysing the overall benefits of the older modernisation process and reviewing the 'Australia Future Tax System'

(ATFS) recently introduced to simplify the tax system. The release of the new system review was fully published in 2010 and is available to citizens over the internet. This shows that there is continuous updating and thorough reviewing of the TA modernisation process even in the most developed countries.

In the developing world, ICT empowered technologies promised to alter the economy of the country when utilised properly in tax administration. From the benefits sought several improvements were listed such as: a) reducing the significant shadow economy. By detecting and analysing more economic activities not registered in the taxpayers base may allow the tax authorities to estimate the size, revenues, and profits not reported, thus estimating this loose sector; b) by being able to link revenue authority computer systems to the banking sector systems, economic activities of taxpayers can be cross checked with their end of the year tax filing receipts, that in turn reduces errors in reporting and helps in identifying non-filers; c) VAT could easily be checked by cross checking merchants invoices and receipts; d) tardiness and absenteeism are better recorded and dealt with when bio-metric machines electronically record the employee's time sheet; e) more info can be given out to taxpayers through electronic means and internet portals (Gichoya 2005; Bird and Zolt 2008; Ramessur et al. 2008; Fedorowicz and Dias 2010).

This research, studying the impact of ICT on the functioning of the revenue authorities in a developing country (Lebanon) is a humble contribution to the body of literature in this part of the world that has seen very limited academic activities.

2.2.0: Modernisation by the Developing Countries in TA

The promise given to developing countries was that they can use technology that has been developed and produced in the developed world and save a bundle on research and development costs, leapfrog all the design stages, and profit from the full benefit in a speedy manner. The success or failure of this use is beyond the scope of this research. However, articles related to failure of ICT application in the developing world show a high failure rate (Heeks 2000; 2002, Sahay and Avgerou 2002). Developing countries range from the very poor (sub-Saharan Africa) to extremely wealthy (the Arabic Gulf states) which makes tax administration policy different among each individual country. The United Nations classified countries by what is referred to as 'Computer Industry Development Potential CIPD' and an 'e-government readiness index' to describe how advanced or less advanced a country is (Gichoya 2005, IDRC 2007). In spite of the wide differences most of the countries are indulged in modernising their tax systems, using ICTs that became affordable, to benefit from the sought efficient tax regime (Gupta et al. 2008).

According to the World Bank, the OECD and International Monetary Fund (IMF) literature (working papers available online from their respective websites), the South American, Eastern Caribbean states, MENA, Sub-African, and Asian governments started modernising their tax regimes early in the 1990's. Even countries in Europe such as Greece, Spain, Turkey, Portugal and the Transitional States (Old Soviet bloc) are vigorously re-hauling their tax system to improve service delivery to citizens and to enhance tax collection needed to run their affairs. For example, Greece embarked on using on-line taxation in 1995 (Gouscos et al. 2001, Terzis and Economides 2006); Turkey started its customs administration and tax administration reform by launching the 'Public Financial Management Project' (PFMP) in 1996 (Barbone et al. 1999); Romania launched a

'Document Management and Tax Automation System (DMS & TAS) Project' in March 2003 in order to strengthen the local governments' capacities and improve service to the business environment by providing quick and easy access to all sorts of governmental documents (IDRC 2007); Latvia's TA modernisation using ICTs was with the introduction of 'The State Revenue Modernisation Project' in October of 1998 (Barbone et al. 1999).

Brazil officially launched internet tax return program in May 1997 (Vasconcellos and Rua 2005); Mauritius introduced the 'E-Business Plan for Local Authorities' allowing 24/7 online service delivery to citizens and businesses in several cities in February 2009 (Ramessur et al. 2008); in the Philippines 'Tax Computerisation Project' started in 1993 aiming to provide faster administration of revenues. Later on, Oracle Database 10g was utilised in 2005 as a fully computerised system with all suitable applications for real property tax collection. The immediate benefit was an increase in property tax collection of 62.4% compared to the 2004 figures (Barbone et al. 1999); Colombia and Jamaica had their TA reform program in 1993 and in 1994 respectively. Albania Tax Administration Modernisation Project started in 1995, Armenia in 1993, Cote d'Ivoire, Cameroon, and Chad in 1994 (Barbone et al. 1999).

The Middle East had its share of tax administration reform in the 1990's. Lebanon started the 'Revenue Enhancement Project' in 1994. The project was aimed at enhancing revenues by using ICTs in three different areas; namely customs (1994), tax regime (1995), and Value Added Tax (2001). Yemen and Jordan followed in their own projects in 1996 (Barbone et al. 1999, Haughton 2004).

From the above mentioned list, a rush in TA modernisation using ICTs can easily be detected in the developing world. However, the impact of this ICT

empowered modernisation, this research claims, may only be estimated and gauged after a thorough investigation of the effects of such reforms on the revenue administration functioning regarding capacity building, ICT readiness, revenue enhancements, and the employees' perceived effectiveness of the reform projects.

2.3.0: Review of Studies on ICT Impact

ICT empowered modernisation projects are part of the e-government (e-Gov) efforts to upgrade their institutional performance and improve service delivery (Tseng 2008). Ciborra (2005) argued that e-Gov in the developing world deals with at least three kinds of processes, namely: (1) transaction between administration and citizens and the internal activities of the administration; (2) the creation of a minimal state with agility, transparency and accountability; (3) and the dealing with donor bodies. Therefore, inspecting the impact of Electronic Government Information System (EGIS) on the functionality of the revenue department requires a review of the bigger project scope namely, the e-Gov project.

Notwithstanding, the diffusion of e-Gov adaptation has been on the rise across the spectrum particularly at the turn of this century (West 2004). This is evident from the abundance in e-Gov literature. Gronlund and Horan (2004) indicated this rise citing the surge in e-Gov conferences worldwide and the increase in publication outlets in newly dedicated e-Gov journals such as the Electronic Government Research (IJEGR), e-Gov Quarterly (eGQ), and Journal of E-Gov (JEG). Recent articles show that ICT studies, EGIS projects development, and e-Gov literature are increasingly being conducted in the developing countries as well. Literature from both worlds is expanding and consequently enriching this under-researched subject matter (Gupta et al. 2008). This research felt the need to review various articles in

the e-Gov literature, the e-tax filing efforts, and the application of decision support systems and artificial intelligence in order to uncover the latest findings and identify the gaps in pursuing this investigation.

2.3.1.0: Promised Benefits of E-Gov

ICT utilisation in administration and in public Ministries promised impacts that would produce effective and efficient work process, better democracy and service delivery to citizens. An article by Segall et al. (1994), trying to gauge the truthfulness of this promise, investigated the modernisation of the Australian Tax Office (ATO), the national revenue collection agency, and elaborated on the effect of ICT on such departments in the Australian MoF. The authors cited the continuous need for equipment and infrastructure modernisation to match the pace of change in Information and Communication Technology (ICT) and the need to equip staff with the proper knowledge through progressive training to counterpart the technology's nonstop development. The study listed the benefits from the modernisation in the form of paperless work processes; administration decentralisation; e-mail improving communication; and the reduction of staff levels, yet public workers showed disenchantment by the new system citing job enlargement or job re-design as the major reason. The study concluded that a more participatory design process is needed in which employees and unions' input may help in improving the outcome of the final software draft.

The paper was one of the early studies about tax modernisation and clearly a research of descriptive nature of the Australian efforts in the very early stages of the modernisation process. The study, contrary to the belief of 'lighter employees' workloads after automation', exposed employees' discontent with the system deployed and referred to the need to address the

management, implementation, and training efforts needed to create a change process in which employees' workload and their sense of belonging in the design process are addressed.

The study referred to several factors to improve ICT introduction to organisations. First, continuous training was advised to upgrade employees' ICT cognition to conform to the latest technology. The second factor addressed the need to regularly upgrade equipment to keep up with the pace of technology. The third was the need to have users' participation in the design process to tailor the product to the needs and wants of the users and that participation gives users a feel of belonging to the change process. Finally, the study referred to implementation, leadership, and management issues that need to be fine-tuned to produce a better ICT implementation.

To further inspect the promised benefits, West (2004) in his article 'E-government and the transformation of service delivery and citizens attitudes' tried to assess the impact of the American e-Gov on three sought benefits, namely: service delivery, democratic responsiveness, and public attitudes, in the years spanning from 2000 to 2003. West used data collection from various sources as he inspected and rated web sites (static non-inter-active information to the public) and web portals (a one stop website for citizens to do all executable and integrated online services) across the US. Expenditure on information technology by the different local governments was obtained from each e-Gov investment effort to compare IT costs. He also used a national public opinion survey (conducted in 2000 by a third party) to examine the ability of e-Gov in influencing citizens. In addition, speed of response to 'services offered' was inspected by sending emails to different

local governmental agencies and recoding the time for their corresponding response.

The author found that the majority of the websites investigated were more like the information billboards without the interaction features, yet some sites had contact details of ministries and people. Portals, allowing citizens' a one stop shop for all their needed government documentation, applications, and payments were rarely found in the study. Even though West's article was written 10 years after Segal's (1994), the problems were found to be very similar. West found that the major hindrance to upgrading to portals from the website feature was the shortage of technology resources, be it machines or operators. Other obstacles were facilitating credit card payment and digital signature to secure and safeguard citizens' personal details and money transfers.

The study, checking democratic outreach and responsiveness, through interaction with the public, found minimal evidence. Similarly, the e-Gov application was found to have no effect on the citizens' attitude towards the government transparency, trust, and confidence.

The study was conducted in a developed country (USA) and the findings suggest that despite the advancement, public ICT applications and impacts are still very much under-researched and did not achieve the promised virtues of having democracy, transparency, efficiency, effectiveness, and citizens as valued customers. The empirical evidence showed that the impact is merely on workflow automation and information billboards-type of websites, with the exception of very few local governments. Due to several

factors, including the digital divide, bureaucracy, implementation shortcomings, and lack of attention to employees' morale and citizen focus, positive impacts of such ICT enabled systems were found to be far-fetched.

Veering in the same direction as West, Norris and Moon (2005) noticed the lack of empirical research in e-Government studies and embarked on a research in the US almost complementing the research set by West (2004). The authors conducted a longitudinal examination of local e-Gov adoption, web sophistication, perceived impacts, and barrier of e-Gov adoption in the United States utilising secondary data consisting of two national surveys, conducted in 2000 and 2002. The study designed a guiding framework to assess the different sets of ICT impacts. The framework they suggested divided the ICT impact and exposed areas affected by the system deployed. They prescribed three distinct investigation stages composed of:

- a. Organisational characteristics,
- b. Organisational change, and
- c. Organisation outcome and output.

The first dimension is the input dimension that dealt with organisational and environmental factors. The second dimension is the ICT diffusion within the organisation; this is where the structure and cultural change has to occur to adapt the new technology. The last dimension, they prescribed, was the outcome of the adoption of technology and its supposed benefits on effectiveness, efficiency, and quality among other things.

With a response rate of above 50% in both surveys, the study found that most local governments lacked sophisticated e-Gov (rarely any e-Gov had

fully functional portals) and still rely on billboard types of websites. However, several local governments stated that increased transactional capabilities would be available gradually. Adoption of a website was found to be related to population, type and form of the government, and the metropolitan status. The study found out that ICT increased the demand, changed the traditional pre-deployment roles, re-engineered business processes to more efficient ones, and reduced process time. The findings, agreeing with Segal et al. (1994), found little support to the idea that ICT reduced staff levels and workloads, diminished administrative costs, or increased non-tax revenues. The study re-assured the findings of West (2004) by identifying the similar various barriers to e-Gov adoption.

The longitudinal study gave the before and after status of the e-Gov adoption in the US. The pre and post stages allow for impact assessment caused by ICTs as the catalyst of modernisation (Vasconcellos and Rua 2005). The findings were based on comparable tabulated values from both surveys and the quantitative technique used allowed for an objective assessment. The lack of empirical studies in the e-Gov literature makes this effort a major contribution to empirical work needed in ICT impacted studies.

The article detailed to the findings missed by West (2004) in distinguishing that e-Gov was more successful, and hence impacts were felt more, in areas where the population possess higher level of education and better internet penetration. In other words, recipients of the technology and their level of sophistication were found to be key elements for the success or failure of ICT empowered technologies. The study affirmed the idea that it is a

combination of good technology coupled with well IT informed recipients that may produce a success.

The findings presented in the three above mentioned articles referred to the need to have a socio-technical view of modernisation regarding public organisations where citizens (demanding the services) must first be aware of these services, have the tools to use, and appreciate the essence of these services. Governments' e-services (the supply) must be securely delivered with user friendly interface, available 24/7, and be able to handle the demand. All the findings, however, realised that the supply and the demand were lacking technical training, even in technically advanced countries such as the US and Australia.

Another article titled 'Assessing E-Service Delivery in Mauritius: The Case of the Revenue Management System' by Ramessur et al. (2008) was conducted in a developing country aimed at assessing the impact of the Revenue Management System of the Island of Mauritius. The five constructs of good governance i.e.: transparency, effectiveness, efficiency, responsiveness, and equity were the aim of the assessment. They used mixed methodology to achieve the aim. First, they conducted site visits to municipalities and IT officers were interviewed (qualitative). Then, two questionnaires (quantitative) were distributed, one of them aiming to check the perception of staff (front and back office), while the other one was to inspect taxpayers ratings of the five constructs of good governance. The surveys were administered in the three cities of Port-Louis, Beau-Bassin and Curepipe.

The study tried to conduct an investigation regarding the design of the EGIS and its supposed impact; thus, using a much needed holistic approach to the problem. It addressed the three networks, namely: the officials and IT designers of the EGIS, the end users (staff), and the citizens (beneficiary).

The findings from both methods showed that resistance to change in most municipalities kept manual work in progress parallel to the ICT systems. Furthermore, technology gaps, security, and non-user friendly systems reduced and delayed the adoption of the systems. Notably however, political leadership was not found as an obstacle to e-Governance as seen in many other works conducted in developing countries (Ciborra 2005; Heeks and Stanforth 2007). The in-ability to implement the ICT system as the solo revenue management system made the study fail to achieve its aim in assessing the impact of the automated revenue system using the five constructs of good governance. The study showed possible problems faced by officials in a less developed country as in the form of the lack of knowledge workers, the resistance to change, bad IT infrastructure, and issues with the digital divide.

The two studies of West (2004) and Ramessur et al. (2008) show that both developing and developed countries seem to share some of the same problems (though at different levels) in the form of shortages in knowledge workers and technical support personnel. Similarly, the study found similarities with the findings of Norris and Moon (2005); lower income areas in the US faced almost the same problems as the developing country investigated vis-a-vis rejection to technology.

A successful impact was recorded by Kim et al. (2009) in their article 'An Institutional Analysis of an E-Government System for Anti-Corruption: The Case of OPEN'. The authors investigated how an e-Gov system, the OPEN (Online Procedures Enhancement for civil applications) system in Korea, intended to fight corruption, evolved to become a major tool for administrative transparency, confidence, and trust. Institutional Theory was used as a theoretical underpinning throughout the study focusing on three mechanisms, regulatory/coercive (political and legislative influences), mimetic (copying other systems' practices), and normative (motivation by norms that are prevalent and observed in the domain to which the organisation belong). A single case study was used to investigate the aim of the research in which data collection was secured from multiple sources. Primary data was collected by conducting two rounds of interviews, and by direct participant observation since one of the authors was an information system director in the MoF. The Secondary data available was obtained in the form of published government documentations. The e-Gov application allowed citizens to use online tracking of their application from inception to final results without having to interact with public employees, hence, reducing the chances of bribery and corrupted behaviour. In doing so, citizens were able to obtain real-time feedback on the work progress of the application and have the digital venue to report any wrong doing seen by employees, thus fostering transparency and confidence.

The study succeeded in empirically showing the positive effect of the OPEN system, yet this success can be mostly attributed to the technology sound citizens of the capital Seoul of Korea. By using a relatively small geographical area, with high level of citizens' education, ICT cognition, good IT infrastructure, and strong institutional influence, the generalisation of such findings is doubtful. In addition, the government of Korea implemented

many laws and measures to reduce corruption at that time as mentioned by the authors themselves. Therefore, OPEN cannot claim solely all the successes in the fight against corruption. Other methods may have had contributed to the given aim as well. The study however, is another piece of literature in the effort to show positive impacts of ICTs.

Moon (2003) noticed the potential success of the OPEN system and hinted that some potential does exist for ICT in restoring public trust. The study he conducted argued that lack of trust in governments could be restored using ICT by improving four public administrative factors that include ineffectiveness, policy alienation, inefficiency (wastefulness) and corruption (lack of transparency). Four case studies, in four settings, were analysed to support the argument. The OPEN anti-corruption system in Seoul was cited as evidence of successful reduction of corruption. The second case study discussed the eVA system in Virginia, which provides various procurement information services for public use. Using the eVA system vendors can have more opportunities, simplified administrative procedures, and can easily indulge in reverse auctions to furnish the lowest prices for government purchases. The system allowed reduction in costs for the government and hence was a unique system in the fight against cost-inefficiency. Again to support inefficiency, the third case referred to the IRS installing e-Filing system in the US in 1995. The study showed, using secondary data, that e-Filing provided faster, more effective, safer, and accurate tax filing services. The fourth case studied was an online policy forum in the Pennsylvania Department of Environmental Protection that allowed citizens to get involved in some form of social media aimed at engaging them in what the local government called "People Connection On-Line Discussion Area" to basically participate in discussions about many environmental policies. This ICT empowered system boosted citizens' moral and helped in fighting against

policy alienation. Moon arguably, succeeded in supporting the four identified reasons in restoring public trust by the case studies presented.

However, the case study methodology using selective cases in different locals around the world, each having their own particular characteristics, reduces the reliability of generalising the findings (Benbasat et al. 1987). Despite the claimed positive impact the study argued, the questions can still be asked: what did ICTs impact? How to achieve positive ICT application impacts? Are there different impacts between the developed and developing world? Are there steps that must be followed in order to produce favourable impacts?

Evans and Yen (2005) tried to answer some of these questions when they investigated the differences in e-Gov implementation in the United States and on the global setting. The authors based their suggestions on observations and other researchers' work domestically (in the US) and on the global level. They found out that e-Gov impact vary widely in each individual setting based on circumstances. Whereas the digital divide, culture, history, style of government and its ideology, social values, trans-border data flow, language, and concerns about privacy and security were identified as some global contextual factors, domestically, the impact of e-Gov was found to impact four different stakeholders or entities; 1) the private persons, 2) the government, 3) the academic community, and 4) the consumers.

The authors, not finding any common ground for a universal e-Gov framework for ICT proper implementation, concluded that it is up to the

citizens, as the demanders of the services, and governments of respective countries or localities, as the supplier of the ICT enabled services, to define their relationship vis-a-vis e-Gov applications and the wrangling between these networks will produce the final e-Gov impact. The study drew attention to several priori issues that must be addressed for a positive impact in reference to the need to investigate the power of different social groups or networks that might shape the success or demise of the impact of any ICT applications. The approach in describing the groups' relationships as supply and demand issues was novel.

In a related study, the demand and supply perception was accented by the work of Helbig et al. (2009) who focused their work on the lack of attention to the digital divide that could hinder the 'demand' to an e-Gov application. The study aimed at drawing important parallels and potential intersections between the e-Gov literature and the digital divide literature. The digital divide issue prompts the reader to assume developing economies settings; however, the authors conducted their work in the US rather than in an international setting. They used the supply and demand aspect in their e-Gov analysis where the argument was if citizens (consumers as the demand) do not have adequate technology knowledge (the digital divide issue), then how can e-Gov (the supply) deliver successfully all the said benefits? The study relied on secondary research and reviewed literature on empirical studies conducted in the US on different minorities (Blacks, Asian, and Hispanics) and their attitudes/adoption of e-Gov. The findings cited race, education, income, location, and social grouping as things that restrict information technology access and use. The findings also indicated three implications from the digital divide on research and practice in e-Gov. First, theoretical models, they argue, should consider factors from the digital divide perspective, such as ethnicity, income, age, education, and others, in

considering the end-users as e-Gov stakeholders. Second, framework designers must understand that the users are not one homogeneous group. This in turn will lead to many questions related to who benefits and how are the heterogeneous groups (users) influenced and affected by the technology? Third, frameworks and model creators, and in order to gauge the determinants of demand, must rely on public managers' feedback when implementing strategies.

The study raised crucial points about the adoption, acceptance, and consequent impacts of e-Gov with respect to the digital divide issue. Compared with digital divide in the developing world, an argument can be raised that the users or the stakeholders of e-Gov must be analysed to understand what form of public services are or are not suitable in the ICT modernisation process.

Another study by Chan et al. (2008) conducted macro analysis of the e-Gov implementation in Singapore. The researchers' used multi-methodology to collate primary data. First, they analysed publicly available government documents and publications and then conducted interviews with officials from the MoF and with Infocomm Development Authority (IDA) (the management body of the e-Gov initiatives in the country) to further supplement the primary source of data. Using data grounded interpretive approach in analysing the data obtained, open coding technique based on Strauss and Corbin (1998), and after triangulation of all the data collection sources, the researchers identified a framework of four themes to make the implementation of an e-Gov project successful. They cited '(i) information content, (ii) ICT infrastructure, (iii) e-Government info-structure, and (iv) e-Government promotion' as crucial for positive outcome (p. 239). The

findings were in-line with the results obtained by Helbig et al. (2009) regarding the need to have proper needed information (the supply), with sequencing of information to the level of understanding of the recipients (enhancing the supply), and there exist a need to inform citizens of the need to use the system to obtain success in the e-Gov application (enhancing demand). However, the study added a new item to the supply and demand proposal that of 'channelling of information through an adequate medium'. In other words, if the internet speed and penetration is not adequate, then the e-Gov process will not fully succeed.

Thus far, a trend can be noticed: the researched articles agreed that e-Gov is a form of a supply of services, citizens are the beneficiaries. However, these services need a channel or a medium to transfer the supply to the people who demand the e-services. It was clear that the weaker the IT employees' ICT cognition, the scrawnier the supply service to citizens. Similarly, a weak transfer medium (ICT infrastructure or properties) the slower the transfer of services, and hence the less the benefit is. Finally, the lack of IT knowledge by customers, the less likely they will demand the service or be aware of it. Therefore, it is obvious that for a better ICT impact, the demand and the supply must match in order for the desired impact to be felt.

A further inspection of the issue can be detected in the work of Elsheikh et al. (2008) when they conducted a study in a Middle Eastern country (Jordan) as its government is in the midst of its efforts to join the e-Gov bandwagon. The aim of the study was to examine the challenges which labelled the Jordanian e-Gov efforts as 'lagging'. The methodology used was the analyses of published e-Gov documentation by the State such as e-Gov

websites. After a thorough review of the data obtained, the study found out that there are many challenges that must be dealt with in order to get the full, positive impact out of ICTs enabled e-Gov systems in the Kingdom of Jordan. The founded challenges were summarised as listed below:

- a. Lack of enabling legal framework for e-Gov deployment
- b. Lack of institutional framework supporting e-Government
- c. Lack of allocated budget for e-Gov deployment
- d. Limited IT skills and training among public servants,
- e. Telecommunications infra-structure constraints
- f. Low level of Internet penetration among the population,
- g. The digital divide
- h. Privacy and security concerns
- i. Cultural, religious, and social challenges
- j. Lack of citizen awareness and participation

The study supported the findings of Evans and Yen (2005) and Chen et al. (2008) concerning the demand and supply of ICT services. By inspecting the 'challenges' identified in the Jordanian case, the lack of e-Gov progress can easily be attributed to the weakness of the efforts towards improving and enhancing the supply (items a through d), the demand (items g through j), and the technical ICT element or medium (items e and f). The authors, in their study, re-iterated the presence of three different networks, the suppliers of the services, the technological transfer medium or what is called the ICT capabilities or properties, and the citizens as the receivers of these services.

2.3.1.1: Section Summary

Promises of e-Gov benefits, as seen in the analysed articles, seem to be conditional. As early as the nineties, conditions for favourable outcome were connected to ICT cognition due to training (considered as a form of institution properties) and ICT properties (in the form of good technological equipment) (Segal et al. 1994; Elsheikh et al. 2008), users' engagement and proper implementation management (West 2004; Norris and Moon 2005; Evans and Yen 2005; Helbig et al. 2009). Furthermore, the medium or market where all these services are to be furnished must be adequate in regard to accessibility, availability, and speed (Chen et al. 2009; Elsheikh et al. 2008). It was also hinted by Moon (2003), Evans and Yen (2005), and Helbig et al. (2009), that it is not sufficient to have the best e-Gov properties but rather the users' engagement in the design process must be entertained. They also added that recipients of any such services must be technologically prepared to receive such services.

The holistic view by Ramessur et al. (2008) was cut short due to the failure of the government and citizens to adapt e-Gov services. Hence, the discussion regarding the outcome or impact was not entertained. Other articles discussed in this section, alluded to either pre-deployment or post implementation of e-Gov applications. To the knowledge of the researcher, throughout this investigation, rarely any article depicts the impact of ICT from inception to after implementation. The search then was to find if a global best practice or a global 'model for success' exists.

2.3.2.0: E-Gov Models for Success

An early work was notable by DeLone and McLean (1992) when they proposed a model that presents a more integrated view of the concept of ICT success in organisations. Six major dimensions were listed as crucial in

designing information systems: system quality, information quality, use, user satisfaction, individual impact and organisation impact.

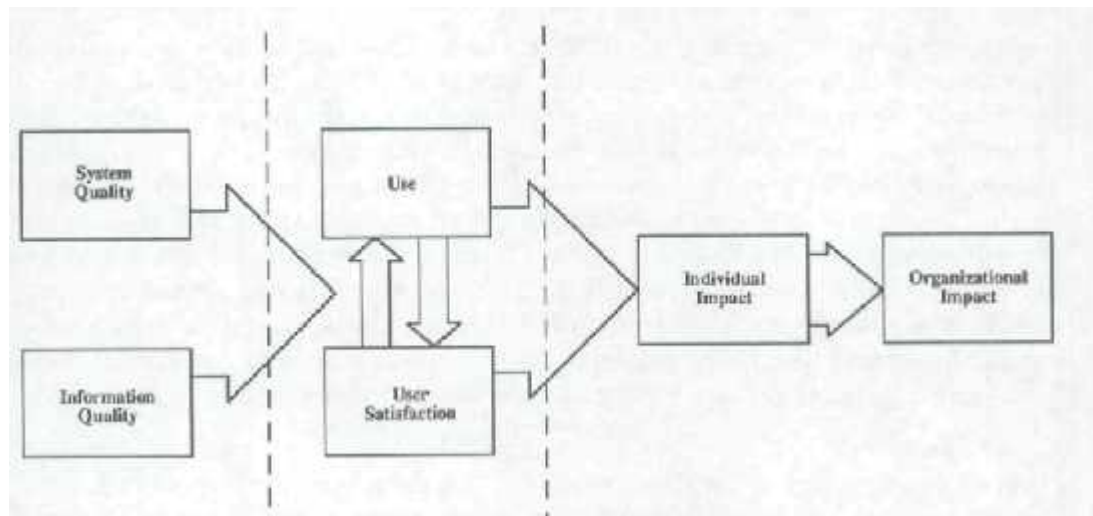


Fig 2.1: Taken from DeLone and McLean (1992, p. 87)

The authors suggested that organisational impact is a collective effort from individual impact and therefore, the positive use of the ICT system is determined by the users provided they are satisfied with the system itself. Satisfaction however, was related to how good the technical system is and the quality of information it can provide. The model was then revised and enhanced in 2003 after the authors received ten years of feedback (fig 2.1).

The 2003 revised model added a significant item that is of service quality. In other words, an ICT system might be of little use if either its information quality is in doubt or the system hardware is malfunctioning or if the service to the system was slow or not forthcoming. Any missing item may render the system as un-usable. In addition, despite good technical and service qualities, the authors realised that if the system is not perceived as user friendly, then it may not produce the organisation's sought after benefits.

Several scholars adopted this new model and tried to validate it in different settings. For example, an empirical study in Taiwan (Asia) was conducted by Wang and Liao (2008). The study was an attempt to validate the enhanced DeLone and McLean's model for IS systems success proposed in 2003.

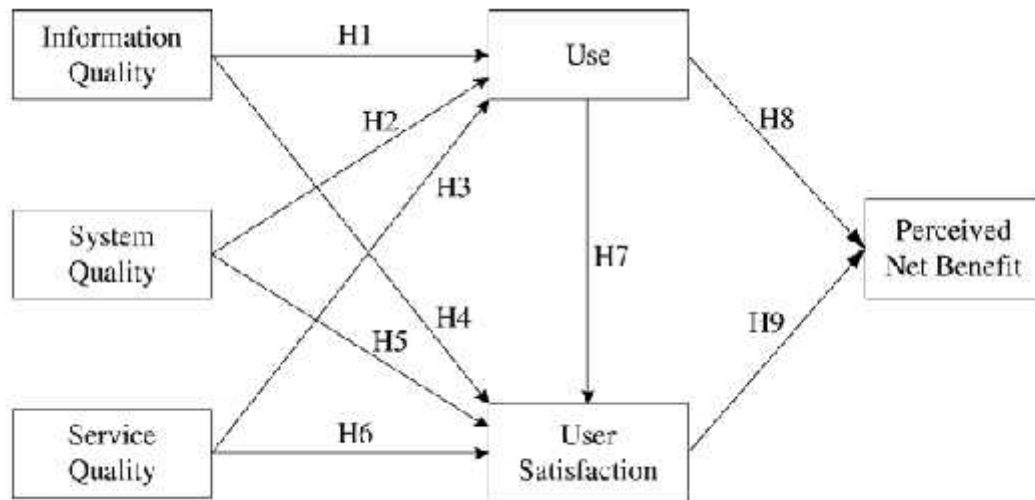


Fig 2.2: DeLone and McLean (2003) model in Wang and Liao (2008, p. 722)

The study used a quantitative methodology and collected data via a survey in six different Taiwanese ministries. The authors used structural equation modelling techniques to analyse the data. The results obtained validated the model by DeLone and McLean (2003) with the exception of system quality variable which had no significant effect on the 'use' variable.

The investigation by Wang and Liao was the first attempt to empirically validate the model produced in 2003 in an international setting and the authors seem to have achieved their objectives; yet analysing the questionnaire used as the research instrument showed only 14 questions to evaluate six variables. It can be argued that a thorough questionnaire might

have been a more adequate research instrument to further validate the claim of success of the model.

Another article suggested a different type of model where leadership in implementation was added as a crucial element for success. Prybutok et al. (2008) examined the effect of leadership and IT quality on positive delivery outcomes in an e-Gov environment. The 'leadership' aspect was considered as the driver of the whole IT system by the 'Malcolm Baldrige National Quality Award' (MBNQA) documentation, a prescribed framework intended to help organisations achieve business excellence supplied to companies by the US government through the National Institute of Standards and Technology (NIST) in the Department of Commerce (DoC). The stated aim of the study was to ascertain the causal relationship between leadership and organisational benefits and the role of IT in connecting them. The authors formed a theoretical model using the leadership constructs from the Baldrige model and incorporated that with the IS success model proposed by DeLone and McLean's (2003) as shown in the figure below:

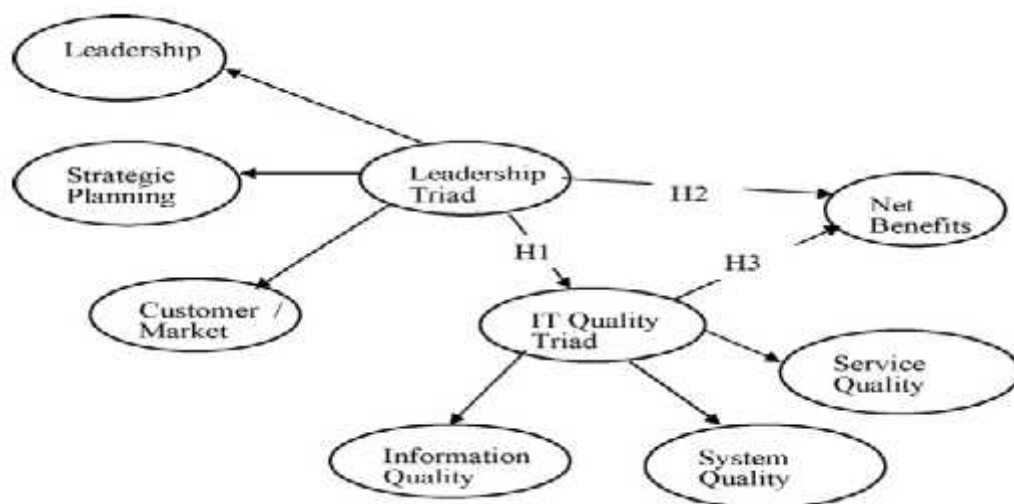


Fig 2.3: The leadership and quality success model by Prybutok et al. (2008, P 145)

The model was an amalgam of ideas, the IT quality triad conformed to the 2003 model, yet a more organisational aspect was added to their suggested model. The leadership triad was more concerned with the recipient of the sought after benefits and the organisational dimension not found in DeLone and McLean's model. Customer/market, in addition to leadership and strategic planning was seen as essential. The two triads, the technical (IT triad) and the organisational (leadership triad) combined, were suggested to produce a more focused approach and claimed to produce positive results.

The study used a web-based survey for data collection to test three hypotheses:

H1. The leadership triad is positively related to IT quality

H2. The leadership triad is positively related to net benefits

H3. IT quality is positively related to net benefits

The model was remarkable by adding the customer element and strategic planning to produce net benefits. Leadership in the institution referred to the role of EGIS implementation via training and pro-active or strategic planning. This combination of organisational and technical elements embedded in the model enforced the socio-technical thinking about ICT induction in companies.

The instrument was pilot-tested and modified based on the feedback. Denton City (Texas, USA) public employees (1100) were surveyed via email

and a response rate of 30.82% was attained of which 16.18% were unusable due to omissions on the returned questionnaires. Partial Least Square (PLS) was used for analysis of the proposed model and the findings supported the hypotheses suggested. The study claimed the achievement of the main aim, but the mere fact that the sample was made of public employees cast a doubt on the 'net benefit' claim. The IT system is a public system; then the beneficiaries (the citizens) should have been surveyed to ascertain the 'net benefit'. The term 'Perceived benefit by employees' would have been much more appropriate findings in this case. Furthermore, in using DeLone and McLean's model, the authors took out a significant portion of the model that deals with the users of technology (the employees) and their acceptance of the proposed system. The study took an organisation deterministic stand when it alluded to the idea that leadership (which is an institutional property) is the only causal effect on IT quality without any consideration of IT artefacts or appropriation of the technology with the users.

Nonetheless, the leadership trait, and its effect on IT quality and benefits, was empirically examined. The perceived impact refers to the importance of leadership in implementing any ICT related project. The findings corroborate with other scholars on the role of institutional properties in fostering positive impact of ICT applications.

Li et al. (2006) deviated from DeLone and McLean's model and focused on the firm institutional capabilities or properties and its effect on the organisation's performance. The authors appreciating the power of the socio-technical system in explaining ICT impacts on institutions divided this capability into two distinct entities, technological and organisational

capability. The aim of the study was to examine the technological capability via examining the role of IT in building up the firm's performance. The impact on the organisation's performance was investigated through examining two mediators identified as information synergy and innovativeness. The proposed framework by the authors is shown below in fig 2.4:

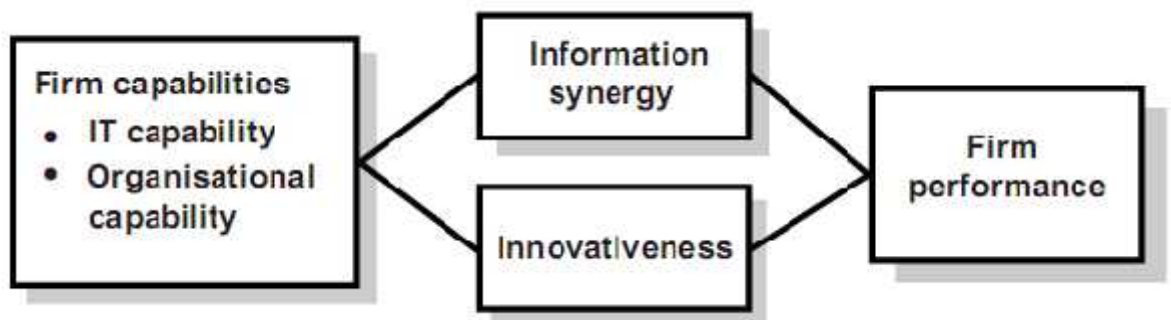


Fig 2.4: Firm performance framework by Li et al. (2006, p. 213)

The model indirectly suggested that to improve the firm's performance, the firm's capabilities of both technical and organisational aspects should be meshed and matched to produce information of great quality and create innovativeness that will in turn give the firm competitive advantage and improve the firm's performance.

The study further developed the framework and suggested ten propositions to test the framework. The success of the combination of the two mediating variables will presumably produce a better firm performance. The framework, taking into consideration both man and machine, appeared to address the issue of ICT impacted organisations, yet no empirical underpinning was conducted, therefore its applicability could not be

substantiated. Furthermore, the study, in explaining the expanded conceptual framework deviated from the socio-technical concept towards an IT deterministic approach when the authors assumed that the IT capability drives the organisational capability. This assumption does not conform with the Socio-Technical System School that cast doubts in regards to the IT centric approach in evaluating organisational performance and call for a mesh between organisational and technical capabilities for the firm's improved performance (Clegg 2000).

Layne and Lee (2001) took a more technical aspect in suggesting a success. They proposed a universal 'stages of growth' model for a full functional e-Gov development. The model proposed four stages of evolution, 1) cataloguing, 2) transaction, 3) vertical integration and 4) horizontal integration. The model suggested that in order to get to the e-Gov final stage, the project must follow a certain path. First, the catalogue stage, where awareness of online presence must occur. Second, the transaction stage prescribes for the interaction between the web site and the recipients of the services offered, such as filling up forms and online transactions. Third, the vertical integration stage is where recipients of the services can ask for other services from any government web portal. This can only be achieved when all government's programs are interlinked. The fourth and final stage, the horizontal stage, is when citizens can access all government offered services from one location in what is called 'one stop shopping for citizens'.

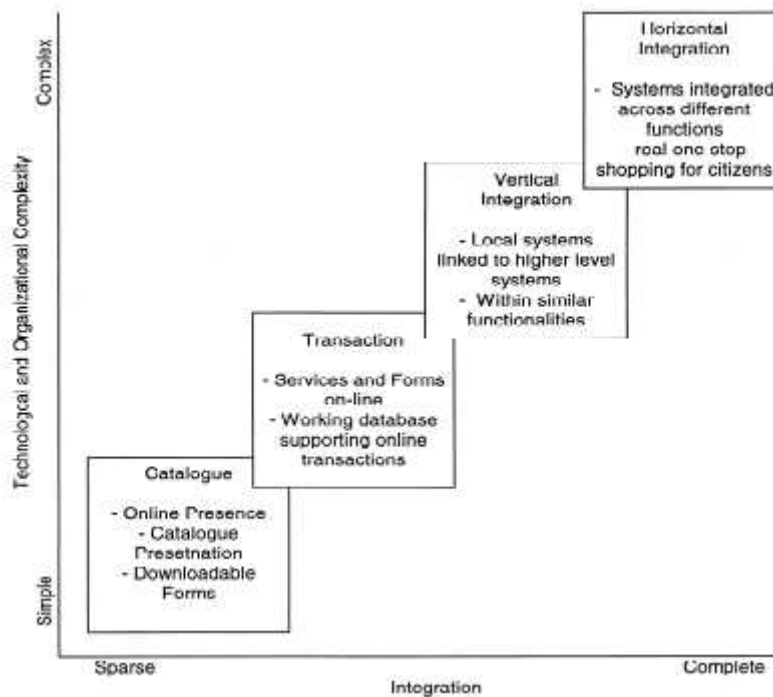


Fig 2.5: Dimension and stages of e-Gov development, from Layne and Lee (2001 p. 124)

The model was developed based on 'observation of common practice' (Layne and Lee 2001, p. 134) in which the authors addressed the social and the technical aspects of applying e-Gov for each stage of the model. The authors agreed with other scholars (Elsheikh et al. 2008; Chan et al. 2008; Helbig 2009) that hindrances to e-Gov resides in three areas, namely: a) universal access (all citizens must have access to the service via their own internet and/or other public facilitated access), b) the issue of privacy and confidentiality must be addressed technically and insure its safety, c) e-Gov must be citizen focused and not focused only on efficiency.

Layne and Lee (2001) conducted their study in the US and the three challenges to the model mentioned above weigh heavily in the different settings, such as developing economies where the internet and electronic

service penetration is still at its infancy, security is a major concern, and e-Gov design is rarely citizen focused (Heeks 2000, Sahay and Avgerou 2002). This in turn, asks the question: Can these models be universal?

2.3.2.1: Section Summary

The models depicted since the early nineties were focusing on the post deployment stage of an IT system, in other words, on organisation's effectiveness and efficiency as seen in the early model of DeLone and McLean (1992). By the turn of the century service to the technological system was embedded in the model after realising that these technological artefacts need continued attention technically and software upgrade on a regular basis (DeLone and Mclean 2003). This was then followed by taking the beneficiaries of the system into consideration and later models incorporated the market or customers of the service as a critical element in the model itself (Layne and Lee 2001; Li et al. 2006). Li et al. (2006) and Prybutok et al. (2008) referred to the socio-technical system when they combined both the technical and organisational aspect in their models citing that both groups, man and machine, when managed properly, will produce a positive effect. What was lacking in the models suggested, however, is the method of how to evaluate the bond between the social and the technical in any given organisation and how to assess what is called a good leadership? How to know the technical quality and capabilities of an EGIS? More questions appeared such as which 'user' or 'users' of technology should be incorporated in the system design, the workers or the customers or both?

2.3.3.0: The Need to Involve Customers in Any E-Project

Investigating the idea about users' participation, Chan and Pan (2008), researching in Asia, conducted a comparative case study of two e-Gov systems in Singapore. The study used Stakeholder Theory as a theoretical sense-making lens citing citizens as one of the many stakeholders affected by the e-Gov systems. Data collection occurred in both e-Gov agencies in the form of semi-structured interviews with the development team, operational team, and external users of the system.

Data from both e-Gov system sites were cross analysed then compared and contrasted to examine the similarities and differences between the user engagement approaches. The study claimed four findings in which users' engagement was found as fundamental to improve the ICT impact. They claimed that 'sustained user engagement' will enable e-Gov to be fine-tuned to meet users' needs; 'user participation coercion' is possible but satisfaction and acceptance of the e-Gov system is not; 'strategic convergence of interest' between users and government must be established to convince user participation; and since user participation is not possible in some projects then 'engagement of salient intermediary in e-Gov systems implementation' can help to boost the effectiveness of the e-Gov system. In other words, Chan and Pan (2008) realised that success of the EGIS depended solely on incorporating the needs of the beneficiaries in model design.

Investigating further the idea of users' involvement, Velsen et al. (2009) agreed with the Layne and Lee (2001) and Prybutok et al. (2008) and adhered to the idea that e-Gov system design enhancement must take into account the targeted beneficiaries for positive ICT impact. The study they conducted was able to justify the citizen-centric approach by using a case

study in Deutschland where a better fit design of an e-Gov service was evident after applying the suggested approach. The authors affirmed that in order to minimise building an e-Gov system that is disliked by citizens; users' business requirements should be taken into consideration before any technical design process starts. The authors claimed that this might produce a better focused e-service that has a better effect and impact on the intended users.

With the assertion that prior work to e-Gov implementation must be done, a new term, summing the man-machine preparedness, the technological infrastructure, and users' readiness for such system, evolved under the name: 'e-Gov readiness index'. The term started gaining popularity as a mean to benchmark and rank countries on how receptive they are to the modernisation and automation efforts in their public sector.

E-Gov readiness measurement was investigated in an empirical study using the city of Denton in the United States by Koh et al. (2008). The authors proposed a three level of e-Gov readiness model that must be addressed for a positive e-Gov impact; the strategic, the system, and the data level. The strategic level checked the long term alignment of internet plans with business plans; system level inspected the coordination of internet development projects; and the data level examined the extent of data sharing among all different internet applications by the government. The authors used a mixed methodology comprising of the qualitative part where six public officials in the government and 13 focus groups involving 73 participants were interviewed. The feedback obtained allowed for the construction of a tailored questionnaire that was used to survey the opinion of employees (the quantitative part).

The findings supported two items in the model; the 'strategic' and 'system' level of e-readiness index whereas, the 'data level' items were not. This was not surprising and could be justified by understanding the culture in some public organisations settings, where sharing of information is often regarded as relinquishing of power. In addition, the study alluded to the social and technological aspect that must be ready on all system levels to allow a successful impact of any e-Gov application. To summarise, the e-readiness was empirically tested and the results showed a need for Socio-Technical fusion in addition to the strategic outlook planning.

2.3.3.1: Section Summary

In the quest of finding a holistic study that encompasses the ICT impact, studies reviewed stressed on exposing and assessing variables and factors such as ICT cognition by workers and ICT properties as in the ways organisations are implementing the IT system and handling the training needs to improve this ICT cognition. ICT properties in the form of software update, system upgrade, and the methods to transfer technology in a given technical infrastructure were also deemed as challenging and crucial to e-Gov success. To complement the holistic study to the impact of ICT, citizens' involvement in the desired EGIS design was seen as crucial for the beneficiaries' acceptance of the IT system. Hence, a new term among the e-Gov jargon emerged: 'the e-Gov readiness index', which subsumed most factors that were seen as essential to a smooth e-Gov service delivery.

2.3.4.0: Framework Transfer Issues

Despite all the positive reviews regarding ways or models to produce positive ICT impacts, the applicability of these models in different settings and in developing economies was the focus of several scholars. Their investigations into the subject matter were aimed at checking the viability of model or framework transfer. For example, Batini et al. (2009) presented a multidisciplinary methodology, called 'GovQual' for e-Gov project planning in order to produce a positive impact. The research focused on the socio-technical perspective of making a successful implementation in public organisations. The article prescribed four phases that encompassed the social, juridical, economic, and technological issues to guide a proper quality impact of e-Gov projects. The phases mentioned are: '(1) state reconstruction, (2) quality assessment, (3) new quality targets definition, and (4) preliminary operational planning' (p. 106). In this context, the paper mentioned a hypothetical example in which a Mediterranean country wants to enhance public administration services by improving efficiency and effectiveness, transparency, simplification of administrative activities, and e-Inclusion hence, foster a positive impact and overcome the digital divide.

Batini et al. designed this model in Italy and alluded to proper transfer of such method to other developing countries. The authors cited Morocco and Tunisia adopting the model in 2008 as an example of such success. However claims of desired impact could not be assessed since the project in those mentioned countries is still in its infancy. In addition, there is a need for empirical validation of the framework suggested before any claim of success.

Again checking on the applicability of framework transfer from the West to Sub-Saharan Africa was conducted by Schuppan (2009). The author's aim was to point out different institutional and cultural contexts in implementing

Western designed E-Gov models in Sub-Saharan Africa. The study conducted in the developing world is a welcomed effort to expose the differences between East and West e-Gov design and implementation. The author resorted to several case studies in his research effort. The case studies analysed customs' system in Ghana, tax administration system in Tanzania, and anonymous online corruption reporting system in Kenya. The work was exploratory aiming at clarifying and analysing the implications of E-Gov in developing countries. Primary data was collected using semi-structured interviews with employees of development organisations and representatives of the scientific community and experts. Other data considered were working papers published by development agencies and a number of workshops conducted concerning e-Gov in the region. He reported that there is a lack of attention in the West to many of the local contextual factors when designing software or trying to implement any form of ICT in the developing countries. The study focused on identifying the African local factors not addressed in the West such as local politics, culture, infrastructure, demographics, economic development, and people's cognition of e-Gov. The author concluded that model transfer is not appropriate and there exists a need to make additional efforts when claiming the appropriateness of the transfer of Western e-Gov models to Sub-Saharan Africa.

The empirical findings suggested that e-Gov applications can enhance transparency, minimise processing time, reduce corruption, and increase revenues. The investigation allowed the author to point out the need to address different factors in the developing countries. The set of contextual factors that emerged, from the three case studies, may be specific to the Sub-Saharan region; the developing world could have more or less factors involved.

Another investigation in Africa was conducted by Maumbe et al. (2008). They studied e-Gov model transfer to South Africa and argued that e-Gov models from the west 'do not work necessarily in Africa' (p. 757). The researchers asserted the idea that e-Gov initiatives should be 'context-specific' and more attention on multi-cultural approaches must be put to attain proper development. The methodology used was by reviewing the literature about e-Gov portals and websites and e-Gov development models to show the problem in transferring these models to the developing countries. They drew from the South African Cape Gateway Project as an illustrative South African local example. The authors enriched the study by citing several examples from Jordan, Libya, Senegal, India and Mozambique's e-Gov programs that were analysed to show that unique factors are involved in each of these countries.

The study concluded that in Africa, the focus should be on development objectives and not the pace of technology deployment. Major obstacles to e-Gov development are due to some contextual factors. These factors, such as the reduction of poverty and illiteracy, availability of funds and human resources, the participation of businesses and citizens in e-Gov design, e-Gov awareness, and user satisfaction must be dealt with for a positive outcome in the South African case. The study showed the difficulty in implementing non-tailored e-Gov by exposing the different levels of wealth, education, health, and demographic concentrations relative to ICT utilisation. Furthermore, the study succeeded in giving seven useful recommendations for practitioners trying to implement e-Gov in Africa and alluded to empirical research in the region as a practical way to direct the focus on e-Gov development.

In Asia, attempts to check the transfer were conducted by Zarei et al. (2008) who investigated the feasibility of transferring e-Gov models designed in the West to Iran. They checked the applicability of e-Gov Development Models (EGDM) and concluded that 'localization is required in order to exploit more advantages' (p. 199). The authors identified several factors, such as technical (e-readiness) and non-technical (public awareness) as hindrances to the applicability of such models in Iran. These factors also included a lack of: overall ICT strategy, trust building among citizens, and stimulus to use e-services. They reviewed literature on e-Gov and different development models as their research methodology and concluded that these models do not fit in the developing countries. They finally proposed their own nine stage EGDM that is more customised to fit the Iranian situation. The authors, however, did not substantiate the claimed short comings of other models followed in the West by any empirical means.

Another article conducted in the Arab world by Al-Shehry et al. (2006) investigated the motivation behind e-Gov transformation in the Kingdom of Saudi Arabia. The study summarised, by tabulating, a list of e-Gov models suggested by scholars from around the world. The authors used two case studies involving two large Saudi public organisations to validate their research aim. Interviews with independent experts in the academic field, IT managers, top managers and with workers from different sub-projects were conducted in order to reduce bias. Data triangulation was achieved by comparing and contrasting documentary analysis and direct observations.

The study succeeded in presenting the aim for which the research was carried out, that is, to investigate the motivation for e-Gov adoption. The

study concluded that 'there is no universal model for e-Gov adoption which can be applicable for all countries to ensure success' (P. 1). In addition, the study referred to political, economic, social, technological, and managerial reasons for e-Gov adoption but added that more research is needed to identify other factors.

Pons (2004) examined the potential of initiating an e-Gov system within the Arab world. The study, despite being conducted earlier, introduced some of the factors affecting the adoption of e-Gov in the Arab world. The author cited what he called 'high level factors' such as online information security, technical and industrial infrastructure that rendered internet speeds obsolete in some countries, socio-cultural attitudes, non-sophisticated university education, and governmental obstacles as hindrance to e-Gov adoption. Furthermore, the study alluded to 'low level factors' such as hardware and software security, regulatory regimes, ill internet familiarity, user perception, low internet penetration due to high cost, and some cultures that views internet and technology as breaking the traditional way of life.

The study went further in developing and explaining a tailored system labelled as an E-Gov System Framework (EGSF) for the Arab world. The framework, however, was mostly technical dealing with hierarchy of databases to secure the citizens' identities when requesting governmental services, yet all the other high level and low level factors, mentioned earlier in the study, were not addressed or included in the suggested framework. In addition, the framework was not empirically tested which casts doubt on its viability. Nevertheless, the study showed that more contextual factors might be hindrance to success, not discovered by authors investigating Africa or Iran for example.

Dada (2006) conducted literature review on e-Gov failure in developing countries. The study attempted to elaborate on the reasons for failure of such promising endeavour. The author explained that there exists a major difference between computerisation of government and the e-Gov status by stating that 'the ability of technology to achieve high levels of improvement in various areas of government thus transforming the nature of politics and the relations between governments and citizens' (P. 1). The article reviewed the work done by Heeks (2000, 2002) and Ciborra (2005) and asserted that Heeks' framework can explain the high failure rates in developing countries. The given conclusion, similar to many other articles dealing with model transfer, referred to the inappropriateness of e-Gov model transfer from the West to the developing countries. He added that there are no similar factors for e-Gov application no matter how some countries may look identical.

2.3.4.1: Section Summary

This section was concerned with model transfer from the West to developing countries. Studies reviewed in different areas in Africa (Maumbe et al. 2008; Schuppan 2009) found little support of the idea of model or framework transfer. Similar findings were reported when areas in Asia were investigated such as in Iran (Zarei et al. 2008) and the Arab world (Pons 2004; Al-Shehry et al. 2006). The issues of contextual factors particular to the country or area of application were identified as the independent variables in shaping up the quality of information the ICT application is to produce (Dada 2006). Contextual factors relating to ICT properties and ICT cognition coupled with institutional properties were seen as the elements that shape the outcome of any ICT effort and hence need to be evaluated at an early stage to comprehend the limits and capacity of ICT impacts. Other elements of the

supposed ICT impact were exposed, that is of poverty, culture and religion, government style, level of freedom in a given country, technology transfer medium, and the resistance to share information even within the organisation itself. The question arises again, how to measure or ascertain the contextual factors in any given project and what is the proper method to gauge the level of preparedness each country or area of application has?

2.3.5.0: The Dire Need to Study Trajectories of Technology

Focusing more on the Arab world, Ciborra (2005) aimed to explain how e-Gov is difficult to implement in the Kingdom of Jordan given the socio-economic context, the characteristics of the local administration, and the dynamics of the technological infrastructure. The study also aimed to ascertain whether e-Gov makes sense or is it intended as an approach to improve democracy, foster development, show transparency, or is it another form of dominating the population. A case study methodology was used to empirically check the general implication of e-Gov and the new public management in transforming the relationship between citizens and state. The author discovered that different actors (Ministries, public officials, politicians, ICT vendors, donor agencies, consultant firms, and technical assistant persons) have different agendas regarding ICT applications. Some of the Ministries were functioning with old technology and resisted any new application; others were not technically ready to apply any technology per se. Needed digital integration among various departments was extremely difficult due to the lack of will in relinquishing power in some Ministries and the difficulty in legislating, passing, and adapting the Electronic Transaction Laws. The findings for the case study can be summarised as Ciborra posited (P. 266):

‘Successful implementation and delivery of e-services demands the transformation of some parts of the Jordan state from a security apparatus into a transparent service agency, where a driving licence is not a public security or general intelligence document, but a quasi-commercial product.’

Ciborra questioned issues of transparency, trust and confidence in some governments, as well as e-service delivery, the citizen or customer focus approach, and the whole new public management trend promised by the ICT modernisation to leapfrog all the hurdles that the West faced in applying e-Gov techniques. The study was one of the earliest works that prescribed for studying trajectories of e-Gov to understand the intermingling of the different networks towards building the final e-Gov applications. The Jordanian case study’s findings pointed out that ICTs do not enable change but rather presuppose them and only a radical transformation politically and institutionally is required to make ICT applications function.

‘The trajectory of e-government in developing countries cannot be identified and understood by looking at the technological features only, or dynamics of the local public administration in isolation, or development as a separate issue. Rather, it needs to be reconstructed, bottom up, by observing the interplay between the various actors involved in the automation initiative’ (p. 271).

The study, stressing on the role each different actor plays in the e-Gov evolution, advised researchers to examine the specific tactics of various actors involved, and to incorporate a broader geo-political framework to enable a new interpretation of ICT project initiatives in developing countries. This call was in coherence with Evans and Yen (2005) who called for not only investigating actors involved but added that the power struggle between different actors and their effect on ICT application outcome must be ascertained. Then the study alerted to the role of some donor bodies and

NGOs in post 9/11 period and the agenda by some Western world leaders to stop and quell terrorism at its origin (some part of the developing world). After Ciborra concluded that Western e-Gov model transfer is not suitable for Jordan, he doubted the supposed 'international assistance's' role of USAID agency, UNDP, and other international system vendors. The author posited in that regard:

'States are handing over, if not subcontracting outright, their tasks and resources in relation to aid to more specialised and professional agencies. This would be part of the increasing externalisation of activities traditionally performed by states, now delegated to multinationals and NGOs.....Except then for extreme cases, this will to govern through reform cannot find an expression in a direct intervention. Rather, it becomes the engine animating the new style of governing at a distance through the public –private networks of aid and the reform programmes such as e-government' (P. 273-274).

That was a rare article in depicting the description and examination of the politics and the external political interference in policy and administration making. This could be due to the fact that Ciborra has had a long interaction with Jordan (Ciborra and Navarra 2005) which created a deep understanding of the situation and allowed the case study to be analysed in its local context. The study bashed the frameworks and models proposed in, and by, the West and actually doubted the idea of e-Gov as building trust and confidence in governments. It rather transferred e-Gov adoption in some countries to another means of controlling the population. Ciborra, based on several of his academic articles, is a well-known critic of donor countries and believed that the whole Western approach to the developing world is not suitable.

Ciborra pointed out the difference in political wills of the multi-stakes groups in the local and the global network of actors. He drew the attention of researchers in the e-Gov field to direct their efforts not only to the socio-technical aspect of the project but also to incorporate political and the power factor of the groups in; at least in the particular part of the world he did his research in (Jordan, the Middle East).

Heeks and Stanforth (2007), concentrating their work in Sri Lanka's Ministry of Finance (MoF), heeding the calls of 'ICT trajectory reconstruction bottom up' by Ciborra (2005) and the 'power wrangling' by Evans and Yen (2005), followed a novel approach. They tracked the trajectory that the Sri Lankan e-Gov project took in order to assess its success level. Using a case study, the authors adhered to a construct from the Actor Network Theory (ANT), called the 'Mobilisation of Global and Local Networks' Framework by Law and Callon (1992), as their theoretical underpinning to conduct the longitudinal analysis and were able to graphically plot the progress, the wrangling of different networks, and the current status of the project, on a diagram that shows the genealogy of the e-Gov project.

The case study analysed the 'Integrated Financial Management Information System (IFMIS)' in the Ministry of Finance (MoF). The intention was to integrate all financial management aspects of the Ministry in one single application. The researchers examined the mobilisation, interaction and disintegration of the local and global actor-networks in the project. They used a research approach of triangulation by adopting three ways of data collection. One of the authors, Stanforth, was involved in collecting data in two different ways; by merely doing her job at the Ministry as a consultant, furnishing official reports on the financial reform process, and by keeping a

daily diary (informally) about the project. The two methods were coupled by a full range of project documentation on e-Government application supplied by the Sri Lankan government hence, used multiple data collection sources. They were able to examine the trajectory of the project and plotted the project's analysis on the graph as shown in the figure below:

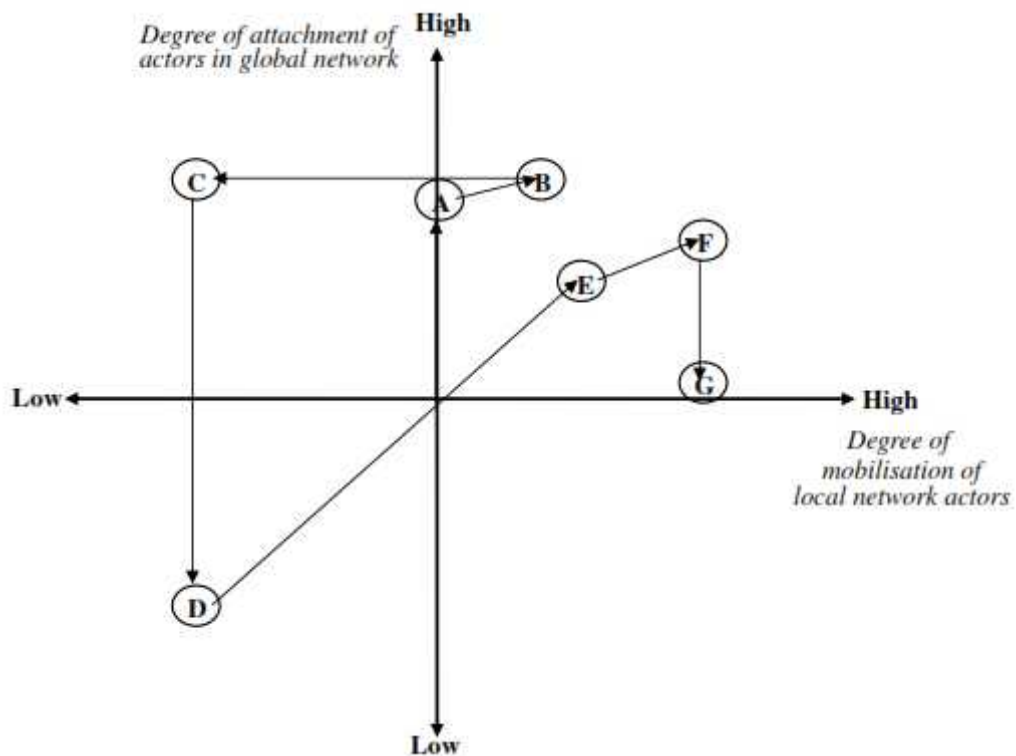


Fig 2.6: Taken from Heeks and Stanforth (2007, P 171)

The project phases are summarised as follows:

Phase 0: pre-IFMIS – money provided to initiate a project to over-haul the government finance management procedures, phase 1: package IFMIS proposal – a local network of actors was formed to implement, under international advisors supervision, the birth of a new IFMIS system that ignores the already present ICT embedded practice by local government

employees, phase 2: failure of initial IFMIS proposal – the new proposed IFMIS failed to become the obligatory point of passage for the interaction of both local and global network due to the rejection of the plan by local actors, phase 3: building foundations for a new IFMIS – concerted local efforts to build, based on their previous ICT practices, a new IFMIS project, and phase 4: a revived IFMIS proposal – a new proposal supported by the local network, the global network except the donor actor which rendered the halt of the project awaiting financial means to complete its track (Heeks and Stanforth 2007).

The EGIS project in Sri Lanka was formed when the global network was formed in phase 0 with donors providing funds and included in addition to donors, consultants and international advisors 'A'; 'B' point was plotted due to the mobilisation of local actors to do the job prescribed and hence form a local network. Local actor network could not be formed (point 'C') due to the rejection of the 'international best practice' which ignored existing local technology by other local actors, the consultants, in the network. 'D' describes the failure of the initiative by the refusal of the local network first then the disintegration of the global one. 'E' represented the formation of the new global network comprising of local officials that rallied the support of a local network made of newly engaged MoF staff and other local supporters. Parts of the complete IFMIS system formed, mobilising more actors in both networks and demanded more finance to complete the task, point 'F'. The rejection of the donor body in providing funds halted the progress of the project and hence, point 'G'.

The obtained longitudinal track plotted on a graph gave a better picture about the integration and/or disintegration between the local and the global

networks. It plotted the genealogy of the design process, the interaction among actors, and the relation between the two local and global networks. The aim of the research was to draw and expose the steps and find out why most e-Gov. projects fail most of the time. The selected theory ANT was used, however, differently in their research effort. While the moments of translation construct of ANT, mostly used by researchers, championed one focal actor where most other actors would have to align themselves with the focal static actor, the authors in this paper used the global and local networks construct from ANT to achieve the aim. The method followed the different champions whether it was one actor, group of actors, local or global networks from the inception of the project to its current status. The ability to follow the developments of the e-Gov efforts in a longitudinal fashion showed how powerful this novel method is. Data collection methods used matched the qualitative aspect of the investigation, yet some could argue that having Stanforth as one of the advisors could have affected the objectivity in one of the data collection methods used, that of notes taking (diary) and minutes in meetings.

The global and local network construct of ANT showed a better handling of a longitudinal investigation than the four moments of translation construct of ANT. However, the method, though it described the processes that the efforts of e-Gov took during its development, the method itself did not identify why e-Gov projects mostly fail and rarely succeeds (the original aim of the research by Heeks and Stanforth (2007). Nonetheless, Heeks and Stanforth (2007) provided a new promising tool for e-Gov analysis to researchers.

Throughout the analysis, however, the following have been identified as possible drawbacks of using/or utilising this method. The study plotted the general outcome of different phases. The outside investigator could see the general track of the project trajectory in its life cycle, however the zoom-in feature of ANT (unpacking complexity to study any one node thoroughly) was not utilised in the various stages of the IFMIS project. For example, point 'C' was plotted because 'the formation of a local network was not possible' (p. 170) but the reason 'why so?' was not clear. The same could be said about point 'G'; Why the Asian Development Bank (ADB) refused to finance the new IFMIS project, even though they agreed on financing the first draft? In addition, the abrupt halt of the project blocked the analysis of the deployment phase. The final EGIS product was not completed. Hence, the expected outcomes cannot be judged and analysed.

As regards to the analysis used, the authors did not follow the traditional qualitative data analysis. The reader was not informed about the interviews and the accounts of the interviewees, but rather a summary by Stanforth was given about the macro situation. Transcripts of interviews and questions posed were not released. This in turn baffled the reader about what happened in each of the networks on the micro-level. It could be argued that if the stories told were analysed with proper data analysis, then the reader might have had a better understanding of how the authors arrived at their conclusions.

Notwithstanding, the study was a pioneer in studying the trajectory of an e-Gov project using this kind of framework. Irani et al. (2007) in reviewing the new trends in ICT literature posited that:

'Heeks and Stanforth provide a research tool for the analysis of e-Gov trajectories drawing on the actor network theory in an attempt to explain the dilemma of frequent projects failure or success....the new perspective offered in this contribution provides a valuable insight into the local and global actor networks that surround e-Government projects' (p. 104).

For the longitudinal study at hand the authors were able to clarify the history of the project made and what happened from inception to its current status. The aim of the study was to assess the success or failure of the project by looking at the path it took, and by checking the interaction between the local and global networks. The path the project took showed the degree of success or failure at different stages of the project's lifespan but the final assessment of success, however, was not made due to the fact that the project was abruptly stopped.

Heeks and Stanforth (2007), introduced researchers to a new venue in looking at e-Gov projects that are in reality a bunch of programmes that do not have a usual end date and keep on evolving. Whereas researchers used ANT four moments of translation where a champion has to be identified and all other actors will have to eventually buy into the champion's views. Global and local networks attribute of ANT favours the idea of network integration between the local and the global with the programme as the obligatory point of passage (OPP). This departure from the original ANT doctrine seems to be more suitable for e-Gov. project/programme with multi stakeholders where the idea of one champion is just obsolete. The authors failed in achieving the aim they had set out for, as themselves realised that plotting the success or failure using trajectory mapping does not work since the e-Gov projects is more of a programme that keeps on evolving and does not have an end. Trajectory mapping was seen to be more suitable to expose

the wrangling during a longitudinal study of networks and the impact of that wrangling on the final outcome of the design manuscript.

On a positive note however, the ANT global and local network was seen as a major improvement in handling e-Gov complexities associated with such programmes. Furthermore, the novel method promised practical value to practitioners. It was clear from the analysis conducted by the authors that a solid sound project design does not mean success. They simply put it as:

“Even a technically sound project will be ineffective if it is unable to generate an understanding of and a plan for addressing the contingent outcomes of the power relationships affecting the affected by design and implementation’ (p. 175)

The authors suggested that flexible and vague e-Gov design could be a better idea to encompass the interest of stakeholders and may foster or help in network persistence. The authors made reference to power and distinguished between ‘power to’ and ‘power over’. It was shown that authoritative power may not necessarily be a barrier to influence with the presence of actors empowered by technical knowledge. These conclusions may aid practitioners on proper methods of implementations in a large EGIS programme.

The idea of using global and local networks construct of ANT in IT related studies was actually first used by Law and Callon (1992) in analysing the fate of the failed TSR.2 project, which was an attempt by the UK government during the 1950’s and 1960’s to build a new military aircraft. It was also used as a framework in the design of a software by different companies as used and analysed by Gasson (2006). More insights of prior to

Heeks and Stanforth's (2007) use and the subsequent after their paper's usage of the method, is presented in the next subsection.

2.3.5.1: Research Papers that Used Trajectory Mapping

Trajectory mapping technique utilisation was explored prior to Heeks and Stanforth's (2007) research paper but it was used in the software design process rather than e-Gov programme. Gasson (2006), faced with multi-stakeholder software problem used the ANT construct 'Global and Local network' to map the design trajectory of a business-aligned information system named NTEL. Seven teams of organisational managers (the multiple stakeholders) were involved in the NTEL design. A unique design of the information system was born after the complexities from negotiations, situated realities, and wrangling among both global and local networks were resolved. The stages of the different political issues of the project, or the trajectory of the design process, were plotted as shown in the figure below:

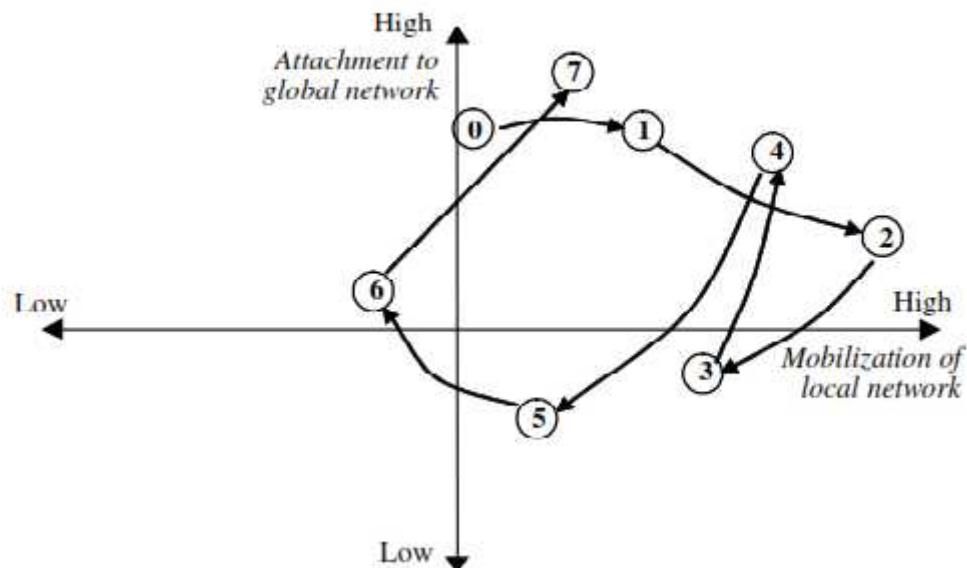


Fig 2.7: From Gasson (2006, P. 38)

Even though her study was not on implementation of ICT but rather a design process of a software, the proper use of the ANT construct (mobilisation of Global and Local network) was notable. The study found that the ANT ontology itself (which prescribes that reality emerges out there) was utilised to bring about the final version of the software. In other words, the truth came out from within and not interpreted, using ANT as a lens, by the investigator (Rawas 2010). That in turn, gave the final version of the software acceptability among all the organisations involved. Trajectory studying seemed to be a different and valuable venue to understand politics involved in a project, man and machine interaction, genealogy of the project, and up to date project progress.

Similarly, Muganda-Ocahra and Van Belle (2008), in investigating the managerial process involved in the adoption of e-Gov in Kenya, used trajectory mapping of the ICT project similar to the usage by Heeks and Stanforth (2007) in combination with two other concepts. The authors used Actor Network theory as a meta-theory coupled with Ciborra's (2004) themes of Hospitality and Drifting as critical constructs in inspecting the alignment of actors as a measure of irreversibility in information infrastructure development process. The rationale was elaborated when they posited:

'A dynamic encounter between the technology and the human host, if hospitable, results in drifting' (p. 98).

Qualitative methodology was used and data collection was obtained from interviews with several officials involved and from secondary data. Thorough

analysis of the wordings and statements given by these officials were tabulated and the interpretations hinted to the discursive practice associated with each set of statements given.

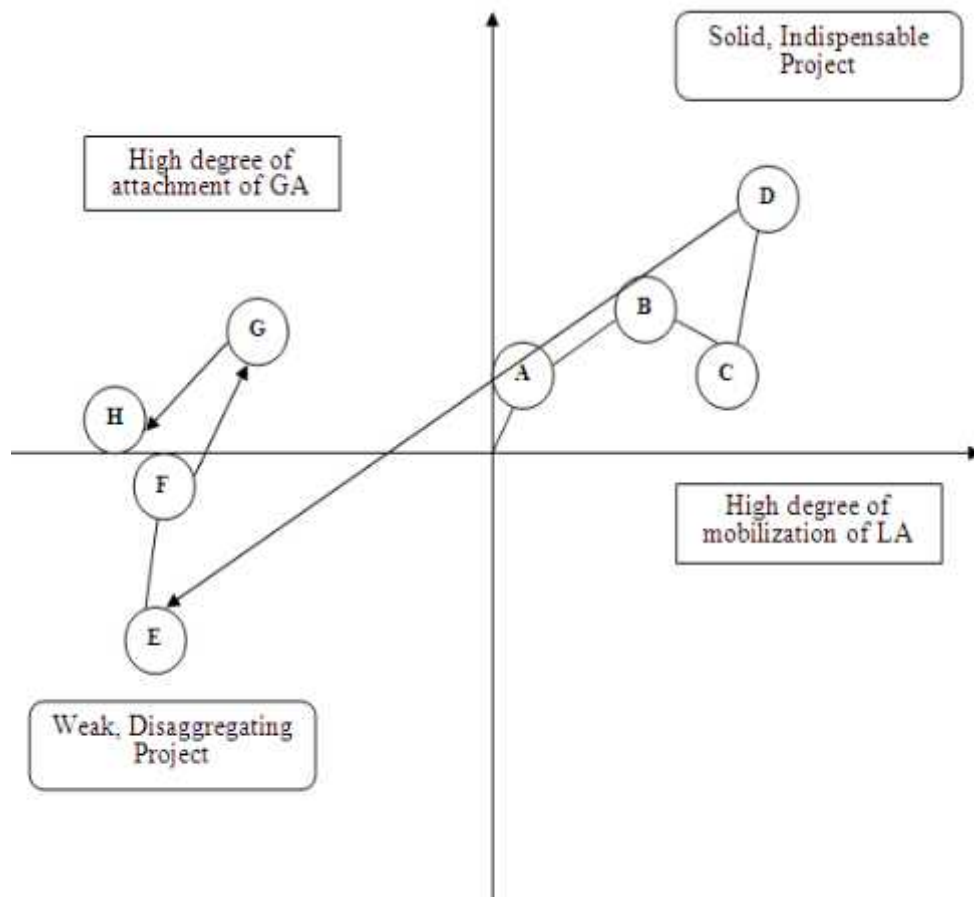


Fig 2.8: From Muganda-Ochara and Van Belle (2008, P. 107)

The study succeeded in identifying the stakeholders, listed the managerial agenda used to implement the various e-Gov projects, and was able to allude to the translation of actors' interests during the implementation process using the moments of translation construct in ANT theory. Trajectory mapping of the process (fig 2.8) showed the overall adoption progress at different intervals and gave a wholesome picture of the hurdles

faced by officials and public servants in Kenya. The study concluded that the projects are somewhat disaggregated with weak mobilisation of actors.

The study used the trajectory mapping, similar to Gasson (2006) and Heeks and Stanforth (2007). However, the study realising the need to analyse further the implementation process, added to the body of trajectory mapping literature, by introducing analysis of the interviewee statements. To that end, the additional technique further explained the points on the graph which clarified the current status. The utilisation of ANT's four moments of translation construct clarified the behaviour of actors using the alignment of interests of different networks and the wrangling occurring inside each network. Complementary to previous studies in trajectory mapping, the reader of the study may have had a better representation of the global picture presented by the trajectory-mapping graph and was able to zoom-in to realise why the points were plotted as such. 'ICT impact effect' nonetheless, was not assessed to gauge the trajectory mapping significance and whether it had any effect on the outcome of the ICT application.

The study showed the appropriateness of Heeks and Stanforth's (2007) method in the design process but not in the implementation phase. This weakness obliged the authors to resort to other investigatory means (such as hospitality and drifting) to further analyse the implementation process where ANT (global and local network construct) seems to have no use. It can be argued that Heeks and Stanforth (2007) did not realise the weakness of such construct in the implementation process for the simple reason that the project did not get to that stage during their investigation. Gasson's (2006) success in using the construct in the 'designing process' of a software could also enforce this concept. In other words, it can be said that ANT

(global and local networks construct) might be ideal for the design process in an e-Gov process but not through the implementation phase where other means are needed to guide the researcher throughout the stage.

Again using both constructs of ANT, Global and local network combined with the four moments of translation was found to be useful in analysing networks when designing an e-Gov project (Ruikar and Chang 2012). The evolution of a network in an e-Gov project in Hawaii was inspected using the global and local network construct of ANT and trajectory mapping technique as shown in (fig 2.9) by Ruikar and Chang (2012). The authors were concerned with the evolution of the stable design acceptable by all actors in the network, in other words, the convergence between different actors through coordination and alignment to agree on a final manuscript. They resorted to ANT as a theoretical framework to show that the final software design was accepted by all parties and networks involved in the design process due to their initial wrangling and their final interest convergence. Ruikar and Chang (2012) followed the conceptual work of Gasson (2006) and Heeks and Stanforth (2007) in the design process of a software aimed to work with several parties.

The unit of analysis was the design artefact that was used as a platform for communication between actors in the networks. The authors used a case study that collected data from multiple sources in their natural settings. Interviews were conducted with the design team actors as well as project managers, the program and fiscal managers, the providers being the end users and the authors themselves were participant observers. In addition documentation were provided and analysed by the authors.

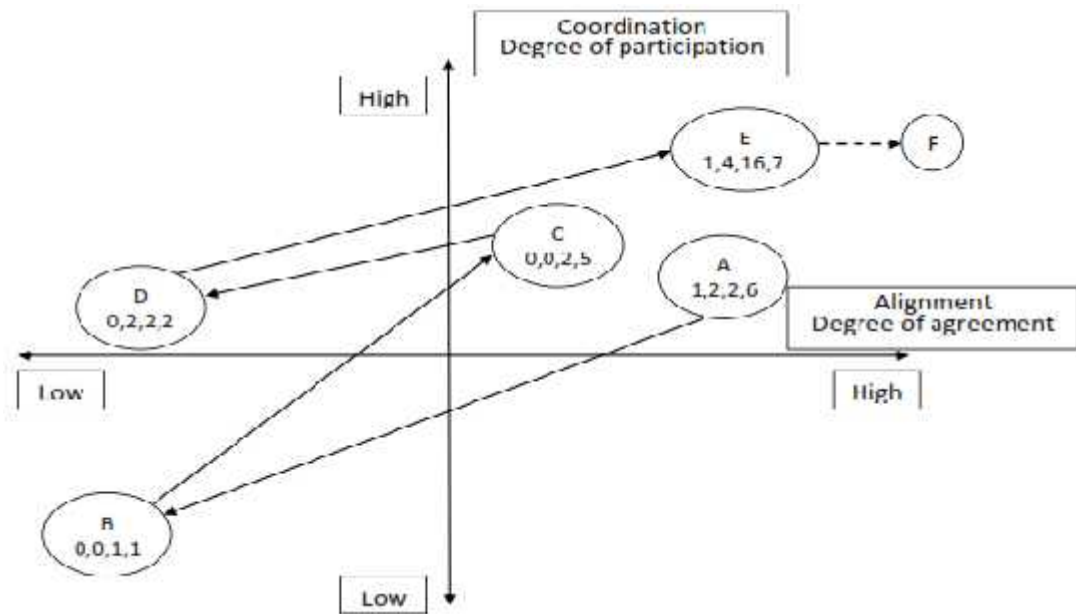


Fig 2.9: From Ruikar and Chang (2012, P. 2598)

Their findings suggested that translations for a stable network take time and they happen in iterative manner contrary to what ANT depicts. Stabilising the networks required that e-Gov project's administrators should maximize coordination to maximise the advantage dynamics of interrelations between different actors, and minimise common interest between actors to mobilise them into a more robust network. Furthermore, they found out that through the wrangling of networks and actors, many technical solutions were replaced by socio-technical solutions that made the links inside the network stronger but rendered the system design weaker. Nevertheless, the final technical design became a communication platform to mobilise all the actors and hence was considered as the OPP (Obligatory Point of Passage).

The authors using global and local network construct of ANT achieved the aim they were set for in this case study. The method used showed its ability to guide the research throughout the design process until a stable network

(all stakeholders agree on a plan or design) is agreed upon and an OPP (the software manuscript) is well defined.

Another recent article using Heeks and Stanforth (2007) method was by Strong and Letch (2012) where the authors attempted to study the failed project of integrating Australia's distributed cultural collections in one portal named Australian Museums Online (AMOL). They used a case study that covered an eleven year history of the project. Data collection was solely based on official records by the government that contained strategic plans, tenders and review, minutes from meetings, correspondences between managers and regional museums, relevant consultation documents, notes from executives and emails from staff about AMOL. The authors chose Heeks and Stanforth (2007) framework as they posited:

Heeks and Stanforth (2007) use this local/global network analysis to a great effect when analysing eGovernment Project trajectories and the implementation of eGovernment Projects in developing world contexts. These analysis give a solid foundation to how this case study can be analysed, and their observational frameworks lend themselves to the analysis of the AMOL case study presented in this paper. By embracing the global/local network tensions, ANT provides a useful lens for observing project implementation, and as Stanforth (2007) and Heeks and Stanforth (2007) demonstrate, when it is applied to eGovernment projects over longitudinal case studies, can provide powerful insights into power relations and the importance of stable networks in delivering successful technology projects.

They plotted the case trajectory as shown in fig (2.10) below.

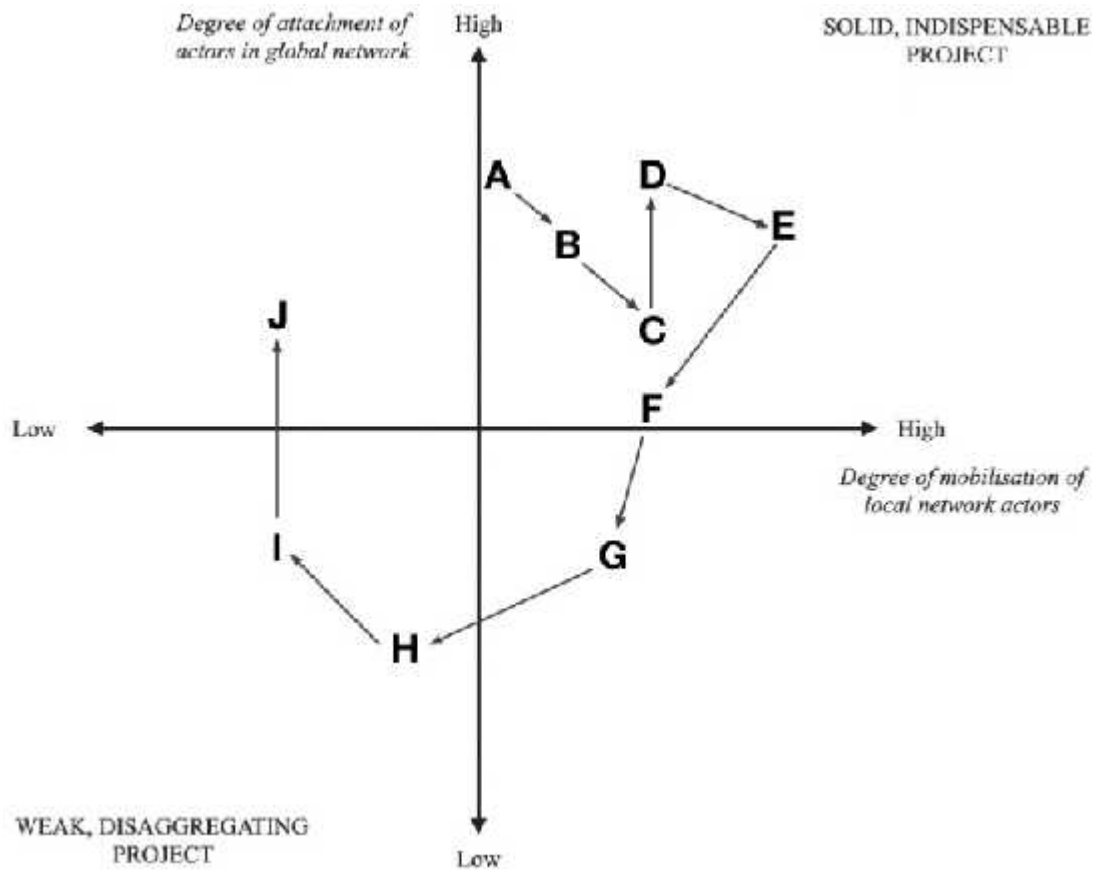


Fig 2.10: Taken form Strong and Letch (2012, P. 9)

The authors described the initial integration between the local and the global networks, hence the points in the positive quadrant, then disaggregation from the global vision was precipitated by the failure to agree upon and adopt a suitable data exchange standard. This led to the withdrawal of two key prominent actors from their roles. One actor was the Museum's Chief Executive (who was extensively involved in AMOL) and the other was the one responsible for the Outreach Programs with all the Western division's regional museums. The local network, being built on personal relationships, and the global network, built on the communication between these two individuals, were both affected and weakened considerably. These resignations, eventually, caused disintegration of the links with the global

network (G and H points). Finally, the project was stopped and new ideas from the global network (going solo) was underway, hence the point J.

Their findings suggests that despite the ability of the networks to stabilise for a certain period of time and achieving technical inscriptions, the role of individual actors central to the network can undermine the stability of such networks swiftly, and quickly can reverse earlier gains achieved. Their finding suggested that stability of networks and the whole programme depends heavily on focal actors in both networks. The removal of those focal actors, whether man or machine, could hinder the whole process and might even render it obsolete. This observation might be an answer to the question posed by Heeks and Stanforth (2007):

‘Network mobilisation and connection may explain project trajectory, but what explains network mobilisation and connection?’

Again, failure or success in e-Gov programmes, was found to be related to random incidents and did not follow a trend. Social determinism could be pointed out as the reason, however, more research is certainly needed in this regard.

2.3.5.2: Section Summary

It is obvious from sections 2.3.1 through 2.3.4 that there is a need to have a longitudinal analysis of any given site when studying ICT impacts. The pervasive benefits from ICT empowered projects were dependent on the assessment of the local contextual factors such as: the ICT environments, the ICT cognition and the institutional properties. Trajectory study of technology was seen by this research effort as a promising venue to the ICT

investigation process. The articles reviewed in this section elaborated this supposed new method and showed that the narration style, the method prescribes for, could inform the reader more about the setting or where the ICT project is to be applied, about the political, technological, and managerial element of such multi-stakeholder project or programme. This acquired knowledge is in a chronological time sequence as the method calls for time- line stage description. In other words, the researcher as well as the reader is aware of the internal and external conflicts throughout the project's evolvement. The network's wrangling described in a plot with points of interest sums up the genealogy of the ICT project and is presented in a special or map form. Heeks and Stanforth (2007) use of such novel method in e-Gov project analysis paved the way for further investigation of using the method. Yet, the use of the method only allows for the study of the 'development and implementation of the e-Gov project' and not the study of the impact of the e-Gov project. Therefore, further literature review was conducted to comprehend what to measure in order to gauge the impact of ICT empowered projects.

2.3.6.0: Ways to Inspect ICT Impacts

With the idea that ICT impacts vary depending on groups of factors relating to man, machine, and mode of transfer of information, the question arises on what is impacted by ICT application in governments and how to check and investigate this impact. This was the focus of a study conducted by Gupta and Jana (2003). Their research was carried out in India and they suggested a framework to evaluate tangible and intangible benefits of e-Gov. Gupta and Jana raised a key question about 'what' to measure in order to quantify the impact or effect of ICT empowered technologies. They posited:

'Mission delivery can be lost if the organisation does not establish measurable goals or measures too many things' (P. 366).

The study cited several factors, among them the digital divide, security after 9/11, and others as impacting the adoption of such technologies. Citing the fact that in any public institution the stakeholders are many with conflicting objectives hence, quantifying the relative factors appropriate to each distinct situation was seen as critical. They justified that mathematical modelling must be ignored in e-Gov frameworks because contextual factors and situations are very different among local or global institutions worldwide. To accommodate the different hybrid e-Gov situations, they proposed a framework with mixed or multi-methodology for problem solving that could be enlarged or reduced based on the complexity of the factors and the assessment of the situation. It consisted of: 1) hard measures, indicating the assessment of cost benefit analysis and benchmarking of the e-Gov; 2) soft measures, alluding to designing of scoring methods, looking at the stages' progress of the e-Gov, and measuring the sociological aspects such as improved decision making or citizens' satisfaction etc.; 3) hierarchy of measures, where three types of valuation were mentioned, the value of the organisation-wide infrastructure, the assessment of the applications implemented within the organisation, and the measure of the users' satisfaction. The study concluded that since the Indian e-Gov project is still in a nascent stage, then assessing the benefits of the e-Gov impact cannot be fully ascertained.

To summarise their findings, the framework flexibility suggested allows for different size and context of e-Gov projects' evaluations. To that end, knowing how to reduce or enlarge the framework requires a pre-data collection to assess the relative factors for the government understudy. In

other words, to study the impact, the pre and the post implementation stages must be assessed (Vascullas and Rua 2005). To use Evans and Yen's framework requires a longitudinal study to identify what IT artefacts cause the impact. Then a longitudinal study involving the post implementation must be conducted to gauge the claimed impact. Their findings were in affirmation to the work done by Ciborra (2005) and Heeks and Stanforth (2007) regarding studying the pre and post ICT application or studying the trajectory of any ICT endeavour from bottom up.

Madon et al. (2004) studied the implementation of tax reform in the fast growing city of Bangalore, India. They were able to closely examine the interaction among actors in the local and global networks. They better analysed by zooming-in on the local network comprising of 'work practices, artefacts like file and ledgers, the buildings through which the files are carried, people involved, and organisation procedures and informal practices that shaped the flow of information' (p. 276), and the global network. Similarly, in explaining the four moments of translation a zoomed-in picture of the local and global networks with the politics behind the reform process was all vivid. The use of ANT translation framework exposed all the wrangling among the actors involved and the micro-pictures were explained clearly. Using artefacts, people, work processes, and even buildings as actors involved in the process of implementation, showed the power of ANT in encompassing all necessary elements in such an endeavour. However, the drawback was on the macro-level in the inability to visualise where the project's status was. Similarly, wrangling between the different networks and among political forces was not so clear and hence the use of one of the constructs of ANT, the four moments of translation, arguably made the micro case clear but the holistic picture a bit blurry.

Tseng (2008) and in line with efforts to inspect ICT impact, adopted Giddens' Structuration Theory to conclude a study investigating the reciprocal causality relationships among social actors under the context of an Electronic Government Information System (EGIS) in Taiwan. Tseng developed a framework based on Structuration Theory and Orlikowski (1992) Model of Technology and used it in the empirical work he conducted. The study used Zuboff (1988) duality of ICT which distinguishes between 'automate' and 'informate' in ICT appropriation. In the explanation, 'automate activities reproduced the logic of the industrial machine and the informate functions provided not only substitutes for the human agent, but also generations of intelligent use', Tseng (2008, P. 411). The study assumed five contextual factors, two EGIS moderating variables, and two effectiveness constructs, 'effectiveness in decision' and 'effectiveness in service'. The model design is shown in fig 2.11 below:

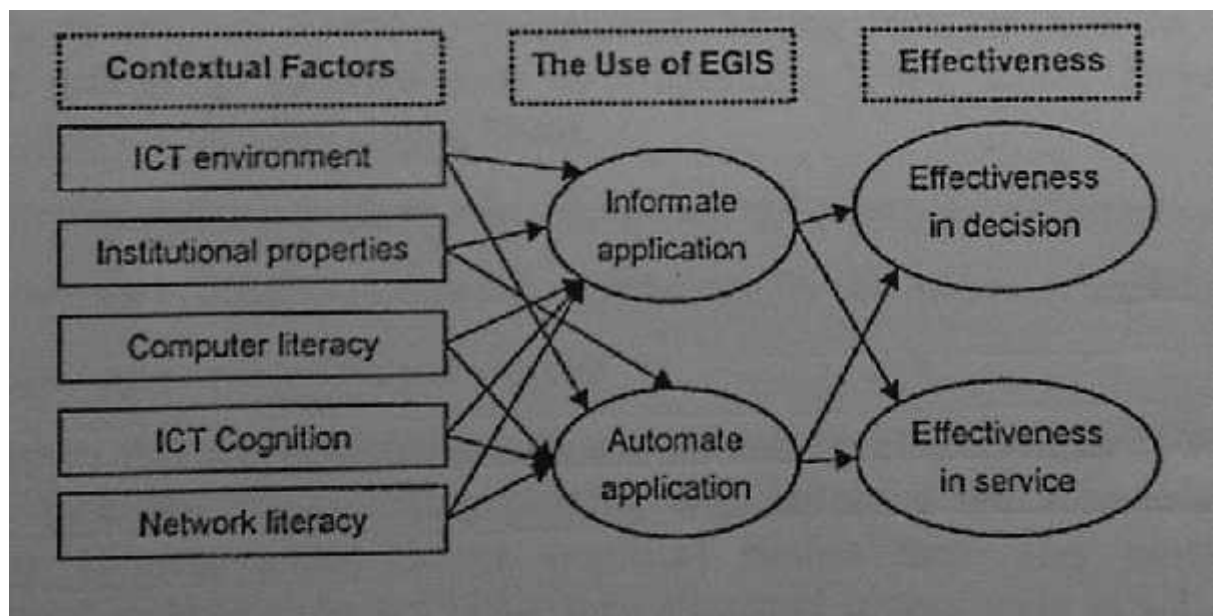


Fig 2.11: Suggested frame work in Tseng (2008, p. 412)

The study used constructs that were validated from previous studies to design a questionnaire as the research instrument. Content validity and piloting of the tools were pre-tested and approved after in-depth interviews were conducted with senior officials to obtain their feedback and improve the questionnaire design. Data was collected from various departments in the government and a response rate of 69% was obtained. Tseng (2008) used AMOS to find out the strength of each of the factors suggested, yet using AMOS suggests that the model depicted has been tested to the case and is fit to represent the Taiwanese situation. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are arguably a better fit to analyse the data obtained due to the power of EFA in removing and appropriating factors relative to the case obtained from answers to the questionnaire.

The findings supported only three contextual factors, namely: ICT environment, institutional properties, and ICT cognition while dropping out Internet literacy and computer literacy. One use of EGIS moderating variable was also dropped, the automate application and only the informate application was supported in showing impact on effectiveness in decision and in service. The study's empirical findings supported and verified 'Orlikowski model of technology' by Orlikowski (1992) who posits that ICT choices are made by human agents who are influenced by specific institutional properties and that same technology is appropriated with the human agent and in turn affects the institutional properties.

The lack of thorough study or longitudinal study of the EGIS led the author to confuse the local contextual factors specific to Taiwan, where he went on suggesting 5 groups of factors. Computer and network literacy were

eventually dropped from the model by the quantitative analysis techniques. This study argues that conducting a longitudinal analysis to the case would arguably direct the researcher towards the relevant contextual factors and hence improve the model design. Furthermore, the study by Tseng (2008) was seen as an attempt to validate a model rather than coming up with a model for the situation at hand.

2.3.6.1: Section Summary

The reviewed articles completed the task intended by this study. To re-iterate, the study's intension was to evaluate the impact of ICT on the Ministry of Finance in Lebanon taking the MoF as the unit of study. The first part of the literature review (2.3.1 through 2.3.5) elaborated that each ICT application has its own characteristics and transferring models from the West might not be the best method (section 2.3.4). Contextual factors were categorised as local to each country or area of application. Identifying and assessing these contextual factors required a longitudinal investigation and 'trajectory mapping of the e-Project' was selected as the most suitable method to conduct that following the conceptual framework set by Heeks and Stanforth (2007).

Tseng (2008) used the contextual factors in a model that led to mediating variables and then to the proposed outcome of the EGIS. Tseng's work was seen as assessing the impact of the EGIS after implementation, hence complementing the work done by Heeks and Stanforth. This study realised that the combination of both efforts were needed to conduct a complete analysis of the ICT impact on the Lebanese Ministry. Gupta and Jana's work alerted this research to the need to know what and when to measure the ICT impact. With that in mind, the study realised that knowing what and

when to measure is critical in the Lebanese case. The choice of the method and the framework suitable for this research effort is explained in section 2.5 of this chapter, but a theoretical review was deemed needed before the suggested selection of the frameworks and theory.

2.4.0: Theoretical Review

Some of the above mentioned studies used different frameworks, different theories, and different methodologies in their attempt to understand the interaction between organisations and ICTs. For example, Socio-Technical theory was used by Batini et al. (2009) and Ruikar and Chang (2012); Orlikowski's Model of Technology which is based on Structuration theory by Tseng (2008); Institutional theory by Kim et al. (2009); Stakeholders theory by Chan and Pan (2008); ANT by Madon et al. (2004), Heeks and Stanforth (2007). The proclaimed benefits and weaknesses were illustrated in the subsections above. However, before attempting to define the use of each of the theories used, a historical view of the use of theory in IS related research was deemed needed to give the reader a little theoretical background.

With the lack of pure Information System (IS) theories, theories were borrowed from the Psychology and Sociology fields to understand ICT and organisation interactions (Truex et al. 2006). Before attempting to inspect contemporary ICT research techniques, adapt a framework, or even follow a theoretical underpinning, the study looked at the evolution of theorising in ICT.

In early studies, the classification of IS research took different approaches. Each of the approaches adhered to different epistemological and ontological methodology. Evolvement of theories was split between two major paradigms that controlled the research area of ICT application: namely the technology led approach where ICTs were seen as the catalyst to create radical transformation in organisational and institutional arrangements or the organisation/social led approach which stipulates that organisational characteristics and institutional arrangements shape the design and implementation of ICTs.

Later on however, the relationship between the two was found not to be that simple but rather a lot more complex (Orlikowski and Barley 2001). The 'Socio-Technical Theory' or Socio-Technical System (STS) emerged calling for a fusion between the two schools. The logic behind STS was that technology and technology-sound-humans must be meshed together for a positive implementation of an ICT system (Caglio 2003; Orlikowski and Yates 2006). Illustrations of the various approaches used in ICT studies are presented in the next subsections.

2.4.1: Technological Imperative Paradigm

Several definitions were given to this paradigm, but this study adopted the review conducted by Caglio's (2003) of the 'technological imperative paradigm' as:

'Information Technology (IT) is conceptualised as a material cause, as a driver of change, which is able to automatically transform organisational structures and social contexts, both at the micro and at the macro level. Information technology is considered to have an independent influence on organisations, exerting uni-directional and causal effects over individuals and structures' (p. 125).

However, the paradigm was discredited due to its lack of considering society in shaping technology. Caglio (2003) added, despite the notable influence of ICT on organisations some major weaknesses could be attributed to this paradigm:

‘It largely disregards the actions of people in developing, appropriating and changing information technologies’ (p. 125).

In other words, Caglio found a missing element in the paradigm namely, the effect of society in re-shaping technology. Barley (1986) had the same opinion towards the paradigm as mentioned in his longitudinal field study examining the introduction of radiographic technology in different organisations.

The neglect of any organisational influence or institutional practice coupled with the inability for this paradigm to explain the relationship between ICT and the organisation, questioned the applicability of the technical paradigm in studying ICT impact on organisations (Wagner and Newell 2006; Bridgman and Willmott 2006; Piotti et al. 2006; Omoteso et al. 2007). Other more incorporating view of ICT study started echoing in the academic arena as Monteiro (2000) put it:

‘It is not sufficient, to study ICT at the granularity of an artefact, or the programming language, the overall architecture or a media for communication’ (p. 3).

To that end, the idea of ignoring agency implied that technology is an abstract, treated technical artefacts as becoming a ‘material determinant of an organisation structure’ (Orlikowski and Barley 2001, p. 148) hence, fixed

in nature, which restrained ICT researchers from looking at the whole picture. With the idea that this paradigm provided an incomplete picture of the impact of ICT on organisations, attention was focused on other venues for more clarifications.

2.4.2: The Social Imperative Paradigm

This is a paradigm which posits that despite the idea that ICT is an essential factor, it is only one of the factors. This school limits ICT as a concept of technological determinism. Omoteso et al. (2007) in explaining this paradigm stated:

‘ICT is a product of human action rather than an objective external constraint.....the organisation’s social contexts are the main driving force for the adoption and use of ICT’ (p. 20).

Treating technology as just an artefact reduced the role of ICTs and that in turn rendered that thinking by the social paradigm as in-appropriate. The relationship between IT and organisations was still too complex to be understood by both paradigms (Orlikowski and Barley 2001; Omoteso et al. 2007).

Briefly said, the two paradigms differ in their epistemology to find facts. The structural approach or technological imperative paradigm focuses on the deployment, use, and design of IT artefacts, hence focusing on particulars and answering the practical question what works (Orlikowski and Barley 2001; Caglio 2002). On the other hand, in the social imperative paradigm theorists strive on understanding the individual behaviour, the behaviour of groups, and thus the behaviour of the organisation as a whole. They primarily try, as Orlikowski and Barley (2001) put it, to answer the question

“why?” A holistic image of the impact of ICT is still vague. Orlikowski and Iacono (2001) went further, calling on IT researchers to desperately seek the ‘IT’ in ICT research. They believed that more IT artefacts research is needed to understand how ICT is affecting the world of business. This opinion is reiterated by Omoteso et al. (2007) where they stated:

‘Neither of the two paradigms can sufficiently explain the impact of ICT on organisations as technology continues to foster a symbiotic relationship with social forces and the borderline between the two continues to be blurred as this interaction grows’ (p. 21).

This led to the popularity of the Socio-Technical theory which was seen, by some scholars, as a solution for the weaknesses of both paradigm and an attempt to better understand this complex relationship.

2.4.3: The Socio-Technical Theory

The introduction of technology to organisation in the middle of the 20th century raised the hopes for productivity and efficiency at work (Furumo and Melcher 2006). Many examples of good technology introduction were confounded with bad implementations and ended in outright failure (Heeks 2000). The inability to achieve maximum benefits from technology was linked to workforce resistance (Ciborra 2005). Sarker et al. (2006) investigating a failed technical project found that rejection to apply technology on the job was not attributed to the technology itself but rather to other more complex factors.

A solution to fuse the two paradigms was being researched by scholars. During the 1950’s and 1960’s researchers from the London based Tavistock Institute suggested a new paradigm to make a fit between technical sub-

system and the social sub-system. The Socio-Technical system approach claimed that for any organisation to succeed and become more efficient, the fit between these two sub-systems must be explicitly conducted (Clegg 2000; Sondergaard et al. 2007). The approach argues that technological implementation requires a flexible and scalable organisation; organisations to make the fit between workers and technology. In other words, the organisation needs not only to have the technical-ready infrastructure, but it also has to extend its concern to the social and psychological needs of the workers. From the 1970's to the 1980's the Socio-technical approach was a popular theory in conducting IS research and many scholars used it extensively to understand and examine IS projects' implementations (Kelly 1978; Adler and Docherty 1998; Frohlich and Dixon 1999).

By the turn of the century and according to Land (2000), the weakness with Socio-Technical Theory, sometimes referred to as Socio-Technical System (STS), is the presence of two conflicting sets of values. The first is the belief in the importance of humanistic principle and the second set of value is the managerial values. In other words, the conflict with the theory arises from the idea of 'Socio', implying the incorporation of the well-being, quality in life, and the humanistic principals of the workers while the main idea behind the theory is to make optimum output in the organisation, meaning generating profits, and not so much the well-being of the individuals at work. Orlikowski and Barley (2001) argued that STS, conformed to the fusion of technologies and the social system but 'gradually abandoned studies of technology and work practices for more abstract images of technology grounded in system theory....STS depiction of technologies came to look very much like the black boxes in the causal diagrams drawn by contingency theorists' (p. 148) and hence lost its main zest. Recently, the use of the Socio-Technical System (STS) has subsided to be increasingly

replaced by a special form of STS theory namely: the Actor Network Theory (Monteiro 2000).

2.4.4.0: Actor Network Theory (ANT)

ANT underscores the main problem with STS thinking. ANT is originally a Sociological theory developed by Bruno Latour, Michel Callon and John Law. The technical part is the fact that the theory treats entities as inseparable networks, without the differentiation between human or machine. ANT refers to these networks as heterogeneous networks, since they contain dissimilar elements. Simply speaking, and as an example, to drive a car you need to look at many networks that are heterogeneous in order to conduct your task. Car drivability, your ability to drive, traffic lights, people present around you, and the weather situation during driving time. All of these networks play a part in your task of driving your vehicle. ANT promised to account for all of these and suggests that if the meshed networks harmonise then a successful outcome results (Lee and Hassard 1999).

The authors explained that an actor, which could be a person, a group, technical artefacts, or whatever, are all equally important to a social network. When the actor network is running smoothly then social order is in check. Social order is broken down when certain actors are removed. This in turn, made it an interesting choice for IS researchers.

Another aspect of the theory is in its ontology. ANT is ontologically relativist allowing for the world to be organised in so many different ways without following the so called 'best practice' (Lee and Hassard 1999). This relativism is seen, by this study, as suitable in studying the alluding

behaviour of the developing world public administration and the insurmountable difficulty in understanding organisations' processes, politics, and boundaries. Finding out that a particular model or framework transfer is not appropriate; an empirically realistic framework enabling flexibility is deemed needed.

The theory however, received some criticism when used by scholars as an interpretive lens (Cordella and Shaikh 2003) or in organisation studies (Whittle and Spicer 2008). Cordella and Shaikh argued that based on the relativistic ontology of the theory, it should not be used by socio-constructivists due to the fact that interpretivism negates the ontology prescribed by ANT itself. Reality by ANT is allowed to emerge out there while interpretivism constructs reality in the mind of the author. Whittle and Spicer appreciated the use of ANT in studying organisations yet critiqued its naturalising ontology and un-reflexive epistemology as hindering critical theory of power in organisations.

Notwithstanding, the theory 'offers an illuminating vocabulary to describe information infrastructure and provides a language to describe how, where, and to what extent technology influences human behaviour' (Monteiro 2000, p. 1). It has been used recently by scholars doing Information System research and found to be very useful due to its ability to combine and differentiate by different elements (Doorewaard and Bijsterveld 2001; Sarker et al. 2006). For example, Sarker et al. (2006) mentioned that including non-human actors in the analysis and the acknowledgement of the instability of the nature of actors, 'ANT can serve as a useful theoretical lens for understanding socio-political phenomena...where technology plays a critical role' (p. 53).

Where other theories got bogged down by the sheer number of different actors, different sizes of organisations and technology implementation, recently ANT is looking as an appealing natural theory to adopt by several literatures in the IS field. (Doolin and Lowe 2002; Sarker et al. 2006; Bridgman and Willmot 2006; Heeks and Stanforth 2007; Azad and Faraj 2009).

This study argues that the use of the two constructs of the theory and allowing ANT ontology to prosper may provide a suitable framework for studying IS applications in the developing world (Rawas 2010). The two ANT constructs are defined in the following sub-sections.

2.4.4.1: The Four Moments of Translation

This section illustrates what ANT's features are, and why it is needed in a multi-stakeholder institution, as in this case study. Lee and Hassard in their book 'Actor Network Theory and After' (1999) explained how a heterogeneous network (actors in each network act as independent actors) is formed. The micro actors, that could be 'individual or individuals, ideologies, methodologies, concepts, texts, computers, or any other technical artefacts' (Sarker et al. 2006, p. 53), form alliances with others and use other artefacts to affirm this alliance, hence, an actor-network is formed made of humans and non-humans. This understanding by ANT gives it its power in studying IT related studies (Sarker et al. 2006).

With big and complex organisations, the flexibility in granularity of analysis is important to conduct an in-depth study. ANT gives the researcher the

ability to unpack complexity and zoom in into one node to study it thoroughly, or zoom out and collapse complexity if needed (Monteiro 2000; Doolin and Lowe 2002). Punctualisation is another feature that allows for treating a heterogeneous network as an actor, therefore reducing complexity when zooming out.

One of the important features or frameworks of ANT is the 'four moments of translation', namely Problematisation, Interessement, Enrolment and Mobilisation (Stanforth 2006; Heeks and Stanforth 2007; Azad and Faraj 2009). Translation refers to the process of having actors aligning their interests with the focal actor through a linear process over time. For the translation to take shape a Problematisation aspect must first be developed, where the focal actor defines his or her interest and creates an obligatory point of passage (OPP). At OPP actors will be able to achieve their interest by negotiating with the focal actor. The process of negotiating among different networks and inside each network to align interest is the Interessement moment, which is the second moment of translation. Enrolment is the third moment of translation, where actors are aligned with the focal actor and identify with the OPP, only then inscription is ensued. Inscription means that the way technical artefacts and behaviour become 'embodied as a set of relations between heterogeneous elements' (Akrich 1992, p. 205). By this linear translation, a 'black box' situation occurs, where new elements, structures, or work processes, habits, whether social or technical, becoming invisible or no longer subject to questioning by social actors (Azad and Faraj 2009), and irreversibility takes shape. Meaning, the new process is the only viable process to enact (Callon 1994).

A summary of key concepts by ANT is represented in the figure below:

| Concept | Definition |
|---------------------------------|--|
| Actor | "Any element which bends space around itself, makes other elements dependent upon itself and translates their will into the language of its own" [9, p. 286]. |
| Actor-network | "Heterogeneous network of aligned interests, including people, organizations and standards" [60, p. 42]. |
| Punctualization | Treating a heterogeneous network as an individual actor to reduce network complexity [34]. |
| Translation | The process of the alignment of the interests of a diverse set of actors with the interests of the focal actor [8, 59]. |
| Problematization | The first moment of translation, during which a focal actor defines identities and interests of other actors that are consistent with its own interests, and establishes itself as an obligatory passage point (OPP), thus rendering itself indispensable [8]. |
| Obligatory passage point | A situation that has to occur for all of the actors to be able to achieve their interests, as defined by the focal actor [8]. |
| Interessement | The second moment of translation, which involves negotiating with actors to accept definition of the focal actor [8]. |
| Enrollment | The third moment of translation, wherein other actors in the network accept (or get aligned to) interests defined for them by the focal actor [8]. |
| Inscription | A process of creation of artifacts that would ensure the protection of certain interests [32]. |
| Speaker/delegate/representative | An actor that speaks on behalf of (or stands in for) other actors [8, 60]. |
| Betrayal | A situation where actors do not abide by the agreements arising from the enrollment of their representatives [8]. |
| Irreversibility | "Degree to which it is subsequently impossible to go back to a point where alternative possibilities exist" [60, p. 42]. |

Fig 2.12: Taken from Sarker et al. (2006, p. 56)

The use of the Four Moments of Translation construct of ANT in analysing financial management and property tax reform was conducted by several scholars investigating ICT project (Doolin and Lowe 2002; Madon et al. 2004).

Doolin and Lowe (2002) argued that ANT is well suited for conducting an empirical research and capable of generating detailed and contextual knowledge in the IS field. In their article 'to reveal is to critique' they re-asserted that doing critical research in the IS field requires a relativist view of the nature of society and the proper understanding of the interaction

between the social and the technical. The authors believe that ANT is best fit to just do that. Criticism of the theory however, was elaborated referring to Walsham (1997) where he argues that it is not only wrangling and translation of actors that creates black boxing situation. Walsham believes that the theory ignores the prior institutionalised social structures that can influence the irreversibility status 'supposedly' invoked by ANT.

Azad and Faraj (2009), asserting the claims by Walsham (1997), used the moment of translation construct of ANT to analyse e-Government institutionalisation practices of a land registration mapping system, as a situated practice. They were able to empirically confirm the existence of a 'black-box' status for some e-Gov functions, explained by the translation construct of ANT, and situated institutionalisation for others. In other words, ANT does explain some new norms due to the alignment of interests of different actors in their networks but institutional practice does have some other effect on changing norms and behaviour. Nonetheless, their findings supported the use of ANT as a dynamic theory that can take into account the multiple players in any large scale e-Government project.

Sarker et al. (2006) used ANT to investigate the events that led to the failure of a business process change at a telecommunication company in the US. The authors used the four moments of translation to classify the failure aspects of the project to each of the four moments. They concluded that the use of ANT construct or framework gave them an informed understanding of where and when problems took place that led to the failure of the system.

The 'Four Moments of Translation' of ANT were utilised in several studies related to IS field. Yet the 'Mobilisation of the Local and Global Network' construct in studying information system applications is fairly new. Below is a short description of this ANT construct.

2.4.4.2: Mobilisation of Local and Global Networks

The other construct selected for this study is explained in the ANT literature written by Law and Callon (1992). They used the network vocabulary to document the way in which the trajectory of a failed British military aircraft (TSR.2) translated. The IS project 'developed in a constantly changing environment such as requirements, interests, and even the actors themselves' (p. 21). They explained that building a project requires the mobilisation and stabilisation of a heterogeneous global network. A global network is the set of relations that is formed (intentionally or not) to create the idea, resources, time, space, plan, in which a project of innovation can develop. The local network is another set of relations sufficiently needed to produce the working device of the planned project (Law and Callon 1992). The two global and local networks are referred to as the outside and inside of the project, respectively. They claim that the way to study a trajectory (its failure or success) of a project is to build the two separate heterogeneous networks and maintain them through the life span of the project with the project imposing itself as the obligatory point of passage (OPP) between the two networks.

Stanforth (2006), in her work towards a PhD degree and following the suggestions by Law and Callon, used this ANT construct and posited that:

'It is possible to plot any project on a two dimensional graph where the x-axis measures the degree of mobilisation of local actors and y-

axis the extent to which global actors are linked and thus describe the translation trajectory' (p. 11).

Law and Callon (1992) explained that the degree and form of mobilisation of the networks determine the degree of success of the project. A successful 'solid and indispensable' project is when the final mark is in the positive x-y quadrant. Below is a figure showing the different quadrant of the Mobilisation of local and global networks as suggested by Law and Callon (1992).

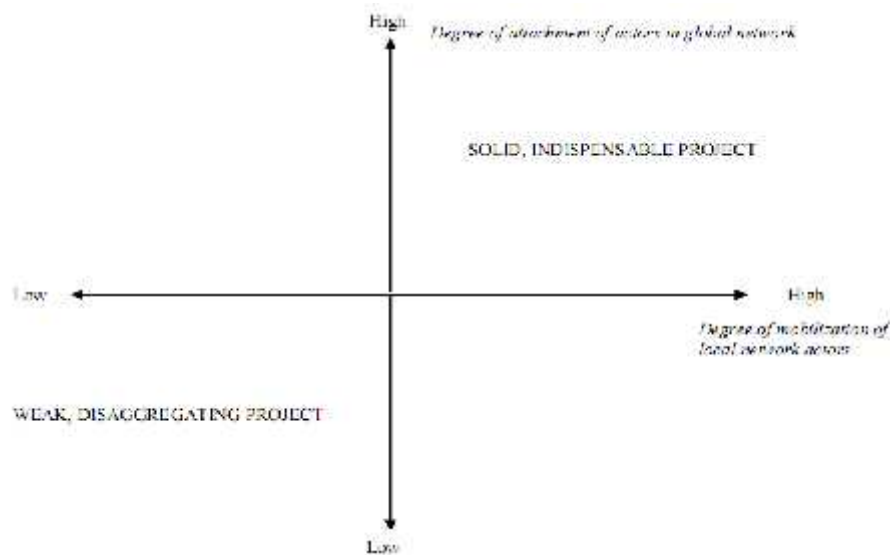


Fig 2.13: Taken from Heeks and Stanforth (2007, P. 167)

With the different actors involved in developing an Electronic Government Information System (EGIS), a thorough search is in order to identify a framework that incorporates the different networks (global and local). Similarly and due to the fact that each and every e-Gov application is done in a different country implies dissimilar settings and hence unlike contextual factors. In the majority of the articles revised, it was advised: 'there is no one solution that exists in e-Gov application'. Therefore, the ability to zoom

out to capture the whole picture, to equate the importance of human and machine, and to entertain the different powers of politicising any governmental project deemed needed in the developing world public sector environment (Heeks and Stanforth 2007). The feature of ANT, the 'Mobilisation of Local and Global Networks' (Law and Callon 1992), incorporates the evolution of projects and promises to be a good tool to examine them from inception to completion, hence look at the trajectory of a project, taking into account the heterogeneous nature of the different actors involved (Law and Callon 1992; Gasson 2006; Heeks and Stanforth 2007). In addition, it allows for the longitudinal investigation of an IS application that may identify the specific factors involved in any complex situation as the case of e-Gov application.

Trajectory mapping of an information system is a new method to study IT projects pioneered by Heeks and Stanforth (2007). Few studies were conducted using this method in the IT world after the introduction by Heeks and Stanforth such as Muganda-Ocahra and Van Belle (2008) and Ruikar and Chang (2012). Similarly the method was used in the study of non-IT related work such as Papadopoulos and Merali (2009) that used the mobilisation of global and local networks in combination with the four moments of translation constructs of ANT in addressing the dynamics and mechanisms underpinning the trajectories and outcomes of process innovation in researching the UK National Health Services. The aim of their research was to trace the network formation, their stabilisation, and their maintenance over time in understanding Lean thinking and how this understanding becomes manifested during the implementation process and during the wrangling of the different networks involved in the project.

ICT projects have alluded scholars and practitioners by their ambiguity, different political interferences (Heeks 2000), non-traditional involvement (Piotti et al. 2006), variable networks' interests (Sahay and Avgerou 2002), and lack of following the set design process (Orlikowski and Yates 2006, Wagner and Newell 2006). Studying the trajectory of 'a project', and not IS project in particular, has been used by Law and Callon (1992) in their efforts to explain the failure of the British military plane (TSR.2) back in the 1950's.

Hence, the mapping of the trajectory of an information system was viewed by this study as a promising venue to understand network formation, interactions and associations between human and non-human actors, and power struggle associated with e-Gov projects. This approach was adopted to expose the relative contextual factors, level of software development and adoption, as well as the evolution of the story behind going digital in the Lebanese MoF.

Another relevant theory to this study was the Structuration Theory. It was used extensively in IS investigations due to its ability to address the interaction between structure and agency. Below is a short summary of the characteristics of the theory.

2.4.5: Structuration Theory

Advocates of the social paradigm found out that failure of an ICT implementation was not due to a poor IS system but rather to the organisation's social structure (Furumo and Melchor 2006). The framework of Structuration is vastly used by scholars to study the introduction of IT to the workplace. Below is a brief description of this framework.

Structuration theory was developed by Anthony Giddens (1979, 1984). Giddens wanted to examine the dualism between structure and agency. The main idea of Structuration is that the repetition of acts reproduces social structures. Giddens explained that 'structure is what gives form and shape to social life and structure exists only in and through the activities of human agents' (Giddens 1989 p. 256). 'Structure is the medium and outcome of the reproduction of practices; equally, human action is both shaped by and shapes the structure' (Gao 2007 P. 106). Agency refers to the flow of peoples' actions; in other words, 'It is the capability of humans to act purposefully, knowledgeably and reflexively' (Omoteso et al. 2007, P. 94).

Giddens redefined the meaning of the notions of structure and agency: 'action, which has strongly routinised aspects, is both conditioned by existing cultural structures and also creates and recreates those structures through the enactment process' (Walsham 1993, p. 34). In other words, Structuration is a process through which structures are produced and reproduced by individuals and groups over time to maintain a norm. People adjust to change by changing processes and eventually, over time, a new social structure evolves (Furumo and Melcher 2006).

Structuration theory was cited by many scholars to be a good framework to study the impact of technology on organisations. By taking the change mechanisms of social systems as structures, the theory was considered suitable for management studies (Orlikowski and Roby 1991; Barley and Tolbert 1997; Allison and Meralli 2007; Gao 2007; Jones and Karsten 2008). Orlikowski and Robey (1991) used Structuration to study ICT implementation. Allison and Meralli (2007) used the theory with 'dialectical

hermeneutics' to "explicate the dynamics of software process improvement (SPI) in a packaged software organisation" (p. 668). Gao (2007) used it in a case study to study a knowledge process management, mostly done by using IT tools, in a consortium. He concluded that the theory "Structuration perspective enables researchers to expose the improvisatory mechanism of organisational knowledge creation" (p. 104).

Jones and Karsten (2008) conducted a critical review of the theory and its application in the information system field. They examined 331 academic articles dealing with information systems published between 1983 and 2004 that used Giddens' theory as a framework. Their summary alluded to a number of attractions for IS researchers to adopt Structuration. The utilisation of the theory, they claim to have found, offers a solution by combining objective and subjective conception of organisations as viewed by IS researchers (Orlikowski 1992). Another attraction to the IS researcher, is the concern with structure (Jones and Karsten 2008), its dynamic view that conceptualises structure as an interactive process (DeSanctis and Poole 2004). Table 2.1, lists the potential effect of Structuration theory on IS application.

Table 1. Aspects of Structuration Theory That Impinge Most Generally upon Problems of Empirical Research in the Social Sciences and Some Potential Implications for IS Research (adapted from Giddens 1984, pp. 281-284)

| | Key Feature | Implication for IS Research |
|----|---|--|
| 1 | All human beings are knowledgeable agents | Researchers should consider social actors as being highly knowledgeable about what they do (even if they are not always able to express it verbally) and as actively involved in the enactment of social practices (rather than being controlled by structural forces of which they are unaware) |
| 2 | The knowledgeability of human agents is always bounded on the one hand by the unconscious and on the other by the unacknowledged conditions and unintended consequences of action | Social actors' understanding of their practices is necessarily limited, so researchers should consider their accounts as offering only a partial explanation of their actions, which needs to be supplemented by other evidence |
| 3 | The study of day-to-day life is integral to the analysis of the reproduction of institutionalized practices | If researchers want to understand large-scale, institutional, social phenomena that persist over time, they need to study the everyday practices of the relevant social actors that constitute them |
| 4 | Routine, psychologically linked to the minimizing of unconscious sources of anxiety, is the predominant form of day-to-day social activity | Most everyday social practices that researchers study are routinized (tending to reproduce social structures), and hence stable over time, because this is psychologically reassuring for social actors |
| 5 | The study of context, or of the contextualization of interaction, is inherent in the investigation of social reproduction | To understand how social practices are sustained over time, researchers need to study the particular setting in which they take place (rather than ignoring, or seeking to control, this setting) |
| 6 | Social identities, and the position-practice relations associated with them, are "markers" in the virtual time-space of structure | Although structure is virtual, its effects can be observed indirectly through its influence on the social roles that people play |
| 7 | No unitary meaning can be given to <i>constraint</i> in social analysis | A variety of different types of constraint (material, sanction, and structural) may enable and restrict social actors in a particular setting |
| 8 | Among the properties of social systems, structural properties are particularly important, since they specify overall types of society | Different types of society are characterized by different structural properties (that shape the norms, meanings, and power relations of social practices) |
| 9 | The study of power cannot be regarded as a second-order consideration in the social sciences | Accounts of social practices need to give particular attention to the operation of power relationships |
| 10 | There is no mechanism of social organization or social reproduction identified by social analysts which lay actors cannot also get to know about and actively incorporate into what they do | People can always learn about social researchers' accounts of how society works and may draw on these in their actions |

Table 2.1: from Jones and Karsten (2008, p. 135)

The article of Jones and Karsten (2008) however, realised the shortcomings of Structuration theory in IS studies. They claim that Giddens almost completely neglected information technology in his theory of Structuration,

and a main concern became the relevance of Structuration in the IS empirical research (ibid). They cited an article by Gregson (1989), who suggested that Structuration is a very general theory to guide in IS empirical research. Gregson, with a degree of acknowledgement from Giddens (1989) who considers his theory as an 'example of a theory', 'a general category', rather than a theory (p. 259), sees Structuration as a 'second order theory' (explaining the events). Other authors, such as Weaver and Gioia (1994), see it as a meta-theory, a way of thinking about the world. Table 2.2 below, lists the potential shortcomings of the Structuration theory given by Jones and Karsten (2008).

| Table 2. Some Key Features of Structuration Theory, Their Implications, and Some Potential Issues for IS Research (Shading Indicates Features That Are Contested by Some Critics) | | |
|--|--|---|
| Feature of Structuration Theory | Implication | Potential Issues |
| Rejection of both positivism and strong interpretivism | Structure does not determine action, but nor is action independent of structure | Universal social laws are markedly implausible, but accounts based solely on individual action and meaning are also inadequate |
| Duality of structure | Structure and agency are mutually constitutive | Structure is inseparable from agency |
| Structure is a "virtual order of transformative relations" | Rules and resources exist only in their instantiation and as memory traces orienting conduct | Material resources, such as technology, influence social practices only through their incorporation in processes of structuration |
| Agents always have the possibility to do otherwise | Structural constraint simply places limits upon the feasible range of options open to an actor in a given circumstance | Agents comply with structural constraints because they choose, rather than are forced, to do so |
| Agents are knowledgeable about their actions and continuously reflect on their conduct | Agents are not passive objects, subject to exogenous forces, or ignorant of the influences on their actions | People, including researchers, should be considered as active, reflexive participants in the practices in which they engage |
| Unacknowledged conditions and unintended consequences | Production and reproduction of society is not wholly intended or comprehended by social actors | Social generalizations are necessarily contextual |
| Essential recursiveness of social life | Society is a complex of recurrent practices that constitute social institutions (and individual identity) | Individual action needs to be understood in its ongoing relationship with large-scale social organization |
| Time space distanciation | Societies "stretch" over spans of time and space | Information technologies may be able to facilitate some level of social integration "at a distance" |

Table 2.2: from Jones and Karsten (2008, p. 137)

Another shortcoming of Structuration theory was cited by Bates (2006) in his article titled: 'Making Time for Change: On Temporal Conceptualisations within (Critical Realist) Approaches to the Relationship between Structure and Agency'. Bates argued that Structuration, and another approach,

Morphogenetic, are 'premised on an ontological dualism of cyclical and linear temporalities' (p. 144), which is not the case in reality. Time is irreversible, while Giddens in his theory employs dualism of 'reversible' and 'irreversible' time. He referred, in his article, to Stones (2001) citing that Structuration theory's large scale efforts are found to be 'quite schematic and indeterminate because they are under-theorised and not linked in a precise enough way to the more detailed meta-theory of structure, agency, time, space and so on'(p. 178).

To that end, Orlikowski (1992) realised the weaknesses issues related to Structuration theory utilisation in the IS field, and embarked on designing a model, based on Giddens but directed towards IS studies.

2.4.6: The Structural Model of Technology

Orlikowski (1992) proposed a model, built on Structuration Theory, to 'allow a deeper and more dialectical understanding of the interaction between technology and organisations' (p. 398). Her work 'The Duality of Technology: Rethinking the Concept of Technology in Organisation', was published in Organisation Science Journal in 1992 and posits that 'technology is created and changed by human action, yet is also used by humans to accomplish some action' (p. 405). A diagram of her model is shown below:

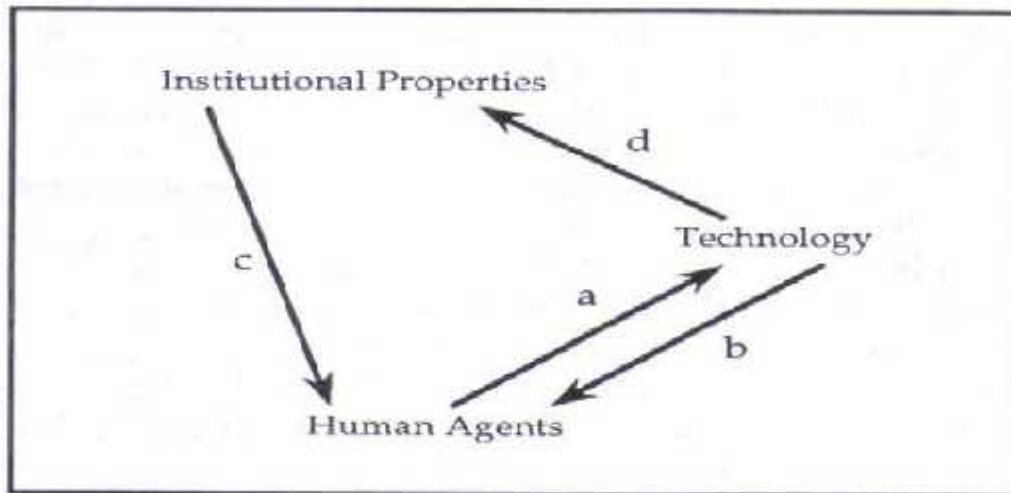


Fig 2.14: Taken from Orlikowski (1992 p. 410)

She claimed that technology, in the first place, is created by human actions, since humans design, develop, and implement technology as shown by arrow 'a' in the diagram. Arrow 'b' represents the shaping of human action based on technology as "technology itself facilitates and constrains human action" (p. 410). In arrow 'c' of the diagram, she alluded to institutional properties that affect the interaction of humans and technology. Finally the 'd' arrow, humans and technology interaction, thus attained, has an influence on the institution itself. In other words, humans create technology, use the technology under the influence of the institution and their own liking, and create the shapes of the subsequent human action. The adoption of technology by humans within institutional frames impacts the institution itself ultimately. Below is a table by Orlikowski explaining the arrows in the above mentioned diagram:

| ARROW | TYPE OF INFLUENCE | NATURE OF INFLUENCE |
|-------|---|---|
| a | Technology as a Product of Human Action | Technology is an outcome of such human action as design, development, appropriation, and modification |
| b | Technology as a Medium of Human Action | Technology facilitates and constrains human action through the provision of interpretive schemes, facilities, and norms |
| c | Institutional Conditions of Interaction with Technology | Institutional Properties influence humans in their interaction with technology, for example, intentions, professional norms, state of the art in materials and knowledge, design standards, and available resources (time, money, skills) |
| d | Institutional Consequences of Interaction with Technology | Interaction with technology influences the institutional properties of an organization, through reinforcing or transforming structures of signification, domination, and legitimation |

Table 2.3: Taken from Orlikowski (1992, p. 410)

2.5.0: Theoretical Frameworks Adopted by the Study

From the articles reviewed, research about e-Gov and ICT-organisation interaction veered in different directions where several methods were used. Each of the approaches selected emphasised the usefulness of different ontological and epistemological characteristics. However, most of the studies investigated part or parts of the complex nature of the interaction between information system and organisation.

To that end, some studies insisted on the uniqueness of e-Gov introduction and assured that each application necessitated different factors. For example, Evans and Yen (2005), Schuppan (2008), Zarei et al. (2008), and Maumbe et al. (2008) realised the need to have the basic local factors to improve acceptance of ICT applications and increase their rate of success. Similarly, some articles followed Davis's (1989) trend of thought which

focuses on the ease of use of technology for acceptance (Wang and Liao 2008; Chan et al. 2008). Few articles found that user involvement in the design of the EGIS is an essential factor for acceptance by employees (Velsen et al. 2009; Chan and Pan 2008; Al Shehry et al. 2006). The digital divide, with its wider meanings, was also listed as a contextual factor in some areas and a hindrance for e-Gov success (Helbig et al. 2005; Elsheikh et al. 2008; Schuppan 2008). Those different mentioned factors, affecting ICT design and implementation, could be classified into three main categories: factors that relate to ICT cognition, to institutional properties, and to ICT environments. With the lack of a full understanding of an e-Gov project a more holistic approach to study of this complex interaction was deemed needed.

The holistic approach idea was the intent of this research in order to understand the ICT impact on a public organisation. This 'holistic' approach in studying ICT related research was previously suggested and supported by Orlikowski and Iacono (2001) in their 'ensemble view of technology' where they proposed that the impact of an IT project in an organisation should be looked at from four different ways: 1) development of the project, 2) production networks, 3) embedded system and 4) structure. This necessitates the need to identify the different teams involved in project development; the different networks such as implementers, users, and even beneficiaries; the systems produced; and the change in structure thus obtained after the ICT's systems implementation. Therefore, it was suggested that for any ICT impacted study, there exists a need to investigate the four different ways to have a full picture. In this regard, selecting the applicable contextual factors, the level of progress in the e-Gov efforts, and the local and global networks involved were seen as a necessary

research components before an ICT impact study can be contemplated (Gupta and Jana 2003; Norris and Moon 2005; Heeks and Stanforth 2007).

Yet a holistic framework to encompass system design, development, implementation, and the eventual impact was not identified even after conducting thorough research in the subject manner. This study in attempting to do that, resorted to two phases in the research and a multi-methodology/theory in trying to encompass the full picture.

2.5.1.0: Theory and Framework Selection

The research was aiming at looking at the holistic impact of ICT on a public organisation, and the relation between organisations and technology. Theoretically speaking, the study reviewed the different approaches to study the impact of ICT on organisations, and summed them in a continuum having theories of social construction from one end, to technical determinism on the other. Using ICTs as artefacts that determine change and impact on structure alone ignored the social aspect. That venue was dismissed as incomplete. Similarly, considering the social stand in studying the effect of technology on organisations ignored the unique technological interactions with humans (the agency aspect). Socio-Technical Studies (STS) tried to address the fusion between the two paradigms, but the tendency to shift the focus back to the social paradigm and ignoring the deterministic aspect of technology was vivid in the STS literature (Orlikowski and Barley 2001).

By the turn of the century, a new form of literature was forthcoming; the social constructivists literature. Social constructivists succeeded in building

on the 'social construction in technology', the reciprocal causality role between agency and technology (Bijker and Law 1992), where a balanced and a thorough understanding of the interaction between social and technical aspect of the problem was taken into consideration, yet most of the literature was concentrated on the design of the information system software on the one hand or on the implementation of the software on the other (Orlikowski and Barley 2001).

ICTs, this study claims, are affecting the organisations' culture, structure, workflow, and even people utilising it. Notwithstanding, people use the technology as they see fit and not as institutionally prescribed in manuals or software documentations (Institutional theory philosophy), consequently shaping and re-shaping technology on a constant basis. This dynamics of action and re-action is always fluid, not standardised, and allude framing it as a constant as earlier literature suggested. This reciprocity of technology impact and the impact of people on technology is understood when it is examined before its early inception, when it is an idea, to the period when it is applied and feedback comes back about its use. In other words, understanding the impact requires a complete study of the issue. This study adopted the epistemology of a social constructivist, and argued that a holistic view of ICT impact must incorporate the interaction between agency and technology, during the application of a technical project and ultimately 'after the deployment' and use. This is presumed as necessity for understanding the full ICT effects.

The interest in studying the relation between the two is ongoing in the academic arena. Following and heeding the calls to research IT within IT (Orlikowski and Iacono 2001; Walsham 2006), this study proposed a holistic

examination of an ICT empowered e-Gov Information System Project (EGIS). A theory that allows the truth to come out (Cordella and Sheikh 2003), with no priori (Monteiro 2000) was sought after and ANT was selected, as its ontology suits the case study at hand and the conviction of the researcher being a critical realist. Critical realists believe in the importance of multiple measures and observations, multi-methodology to triangulate data collection, thus assuring realities as they are (Jones and Karsten 2008).

Using the multi-theory at different stages was not unique to this work. Combining theories in order to understand the impact of ICT on organisation was suggested by authors who integrated more than one theory in their work (Dillard and Yuthas 2002; Berkhout 2006; Omoteso et al. 2007). For example, in supporting the multi-theory approach, Omoteso et al. (2007) suggested a more comprehensive three layered model based on Contingency, Socio-Technical systems, and Structuration theories. The scholars of this particular model proposed a meta-level perspective suggesting that Contingency theory explores the factors that might shape the usefulness of ICT in organisations, the Socio-Technical Systems Theory, filling the gap that Contingency Theory did not address, i.e.: checks the fusion of human actors and technology in the organisation, and Structuration Theory, sheds a light on the effect of the other two theories on the structure of organisations and the tasks performed, thus completing the picture (Omoteso et al. 2007). However, the authors are yet to verify the model by empirical research to validate the findings.

This research found out that combining the three meta-theories suggested by Omoteso et al. (2007) was of crucial importance in guiding the stages of

this research. The contingency was understood by the genealogy of the IT effort exposed by the longitudinal study conducted; the wrangling and pre-implementation of the e-Gov effort was analysed and explained through ANT (a form of Socio-Technical Theory), and the impact was assessed using the theoretical underpinning of Orlikowski Model of Technology (a form of Structuration Theory). Therefore, dividing the research into parts and utilising theories for each part, this study believes, allowed for a better data collection and improved data analysis. This in turn, allowed for the claim that the combination of theories in a research effort, if dealt with consciously, could improve the research effort and direction.

To that end, the study utilised two different frameworks for the two different phases of the e-Gov effort, namely: 'Actor Network Theory/ Global-Local Networks' by Law and Callon (1992) for phase 1, and 'The Structural Model of Technology' by Orlikowski (1992) for phase 2. A thorough case study analyses explained the significance for classifying the two stages as such and assessed the applicability of the frameworks chosen in analysing the convergence/divergence and sometimes the non-correlated movements of the EGIS's variables. The two frameworks are presented with the reason why these particular frameworks were chosen in the next sub-sections.

2.5.1.1: Framework I

This exploratory study found it very hard to conduct a quantitative approach to try to study ICT impacts in an underdeveloped country's public sector organisation. The hardship stems from the lack of research in the area, rendering academic literature obsolete. A need existed to familiarise the researcher with the relative local contextual factors necessary to consider in conducting ICT impact studies (Pons 2004; Ciborra 2005; Schuppan 2008).

In addition, the usable programs and software that may cause a significant difference at the workplace, needed also to be exposed. Therefore, it was clear that a first phase of this research must be conducted to shed a light on the e-Gov effort before embarking on studying variables' causalities, relationships, and impact studies. A framework adopted by Heeks and Stanforth (2007), using ANT as theoretical underpinning, was pointed out, with some modifications, as suitable to achieve the aim of this initial part of the investigation.

The framework called for the mapping of the trajectory taken by the e-Gov effort on a graph as explained in section 2.4.4. This effort followed ANT Mobilisation of Local and Global networks construct theoretical underpinning which argues that a positive e-Gov is obtained when local and global networks settle their differences and accept the proposed project as a solution of the problem they both face (the obligatory point of passage – OPP). Furthermore, a bi-product of this methodology was in obtaining, during this longitudinal study, the applied and workable software with their level of progress in order to identify what to include or exclude for the following stages of the ICT impact study. The proposed framework is summarised in the figure below:

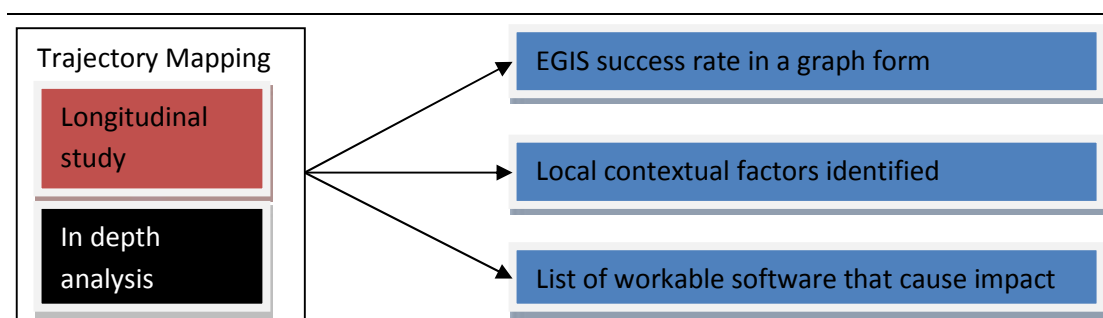


Fig 2.15: The causal model for Phase 1 framework

2.5.1.2: Framework II

Taking the obtained results from the qualitative phase, the second phase could be designed. The predicted degree of success given by the trajectory mapping technique was to be established in phase one. The local elements that make the three mentioned contextual factors categories were identified. Another outcome was a list of workable software that allowed the researcher to determine the actual users of the software in the Ministry hence, paved the way for an appropriate purposive sampling. This in turn, allowed for the design of a questionnaire that was administered to the proper end users to attain their perceived view of the ICT applications. The need was then directed to obtain a relationship between the perceived impact and the identified contextual factors to investigate several things:

- Check if the obtained relative factors are in-line with the employees' perceived impact
- Investigate employees' perceived information quality given by ICTs
- Ascertain employees' ICT impact on their work process and on service delivery

This study considered Orlikowski's model to be a universal understanding of technology interaction by 'humans' in general and takes this model as an applicable concept in all cultures since it addresses the humanistic aspects of any worker despite the surroundings. Similar views were echoed in different studies that used the model in assessing technology and human interaction in organisations (Tseng 2008). Orlikowski's model can be depicted as shown in the figure below:

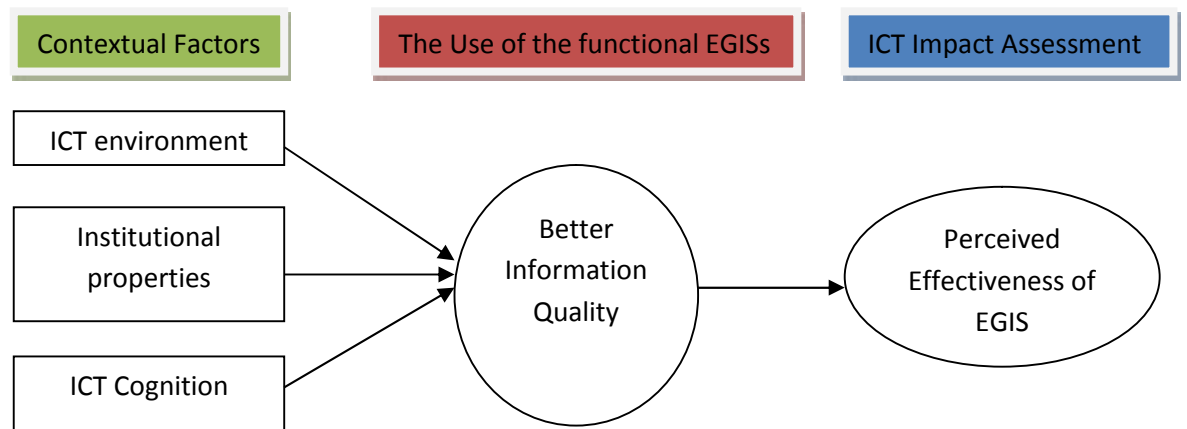


Fig 2.16: The causal model of EGIS for phase 2 framework

In order to examine the effectiveness of the MoF, the study identified a list of items that required testing:

The use of ICT applications will affect the following:

- Information flow (accuracy, form, and time)
- Services to citizens (lead to more trust in the Government)
- Tax administration facilitated by do-it-yourself applications available online to the public

2.6.0: The Emergence of the Research Propositions from the Literature Review

This section discusses how the research propositions came about based on reviewing the literature related to the subject matter and after initial investigations at the research site. The birth of the propositions was achieved after summarising the listed studies in the previous sections showing the existing limitations and the gaps and how this study aims to try to fill these gaps and contribute to the body of literature.

2.6.1: Proposition I: Trajectory mapping of an e-Gov effort exposes the relative contextual factors involved and benchmarks the EGIS success

In the developing economies, heterogeneous networks involved are believed to have more actors than their counterpart in the developed world (Ciborra 2005). Country-specific factors may vary extensively and the impact of ICT, thus obtained, becomes very unpredictable (Maumbe et al. 2008). Scholars, studying e-Gov in the developing economies, trying to assess the ICT impact, explained that the additional factors may come from the local culture or religion (Pons 2004); donor bodies, consultants, or external ICT trainers (Ciborra 2005); the digital divide stemming from IT illiteracy, weakness in communication and technological infrastructure (Schuppan 2008; Zarei et al. 2008); prosperity, or not, of a nation, education, and politics (Al-Shehry et al. 2006) among other factors. ICT frameworks developed in the West may not necessarily work or create development in the east (Heeks 2000). According to Dada (2006), a gap exists noted as 'country context gap' between systems designed in one country and the reality of a developing country into which the system is to be transferred to. This gap or gaps render the transfer in-appropriate and may explain the failure of ICT applications in the developing countries. This is re-iterated in page 7 of his article when he posited:

'It is evident that practitioners must understand the importance of the specific context within which they are working. Such an understanding is critical if one is to consider bridging the gaps between the design and the reality of e-government applications.....No two situations are the same due to spatial and temporal discrepancies, and therefore outcomes can differ significantly even if a majority of factors seem to be similar to a previous case'.

From the literature reviewed, it can be noticed that identifying the local contextual factors by governments is crucial to the success or demise of the EGIS being applied (Ciborra 2005; Dada 2006; Heeks and Stanforth 2007). Researchers investigating e-Gov around the Globe found that factors in the US or Australia may be very different than those in Sub-Saharan Africa, Iran, or the Middle East (Pons 2004; Maumbe et al. 2008). Identifying the local factors allowed researchers to direct the study and reduce research expenditure and efforts. Tseng (2008) for example, assumed wrongly factors based on previous works of scholars not specific for the Taiwanese case. Models produced in the West after the analysis of the Western contextual factors were found to apply in some other areas as in Singapore (Chan et al. 2008) and in Northern Africa (Batini et al. 2009). However, this generalisation was negated when model transfer was found to fail in other parts of the world (Schuppan 2008).

Trying to avoid the so called 'best world practice', or in other words Western designed models, in e-Gov application this research adapted the longitudinal analysis of the research site to understand the case study at hand in depth and expose the relative local contextual factors. Heeks and Stanforth's (2007) use of the local and global framework of ANT looked promising in achieving that. The abrupt halt of the Sri-Lanka's e-Gov project did not allow the authors to inspect the effectiveness of this method in identifying the proper factors. Using the same method or frameworks to identify these factors may place this research as an attempt to empirically test the Heeks and Stanforth's method. These intentions are covered by the first proposition, 'Trajectory mapping of an e-Gov effort exposes the relative contextual factors involved and benchmark the EGIS success'.

2.6.2: Proposition II: Trajectory mapping is a useful tool in identifying and listing EGISs and exposes their current status of deployment

The use of models and frameworks, suggested by e-Gov researchers, is thought to guide the design and implementation process by governments and hence enhance the impact of ICTs on public organisations. To that end, Gupta and Jana (2003) referred first to the need to find out what to measure in an e-Gov application, and second resize the framework to fit the research site at hand in order to evaluate the ICT or e-Gov impact. In other words, the progress of the e-Gov applications must be known before an assessment of any impact study of ICT empowered systems is ascertained. Their suggested framework allowed for the enlargement or reduction of the framework, to include or exclude factors based on the situation at hand. This in turn, sets the ground for identifying what essential elements the impact study must consider.

The fact that the authors discovered that projects should be in a mature stage before they can be evaluated, necessitated the need to identify what are the 'functional' software or automated projects and how long have they been in use. This study argues that, knowing the progress or understanding the evolution of the e-Gov project from inception to the current status (the time of the research conducted) allows for the inclusion or exclusion of certain sub-programs not yet fully developed or implemented, hence allowing researchers and investigators to identify where and what modules to focus impact studies on. As such, interviews with official were prescribed as the venue to understand projects' progress (Heeks and Stanforth 2007; Tseng 2008), but that was misleading in some cases (Ciborra 2005). No article gave a universal method of how to 'identify the projects' and 'assess the projects' progress' simultaneously. This shows the limitations and overall

gaps in the e-Gov literature that currently exists and how this study aims to try to fill some of these gaps. This is probed in the second proposition, 'Trajectory mapping is a useful tool in identifying and listing EGISs and exposes their current status of deployment'.

2.6.3: Proposition III: ICT improved information quality

'Information quality' is the fundamental building block found in almost all the models suggested for e-Gov success (Elsheikh 2008). Tseng (2008), after a quantitative empirical investigation, found out that the informate application amount to the main use of EGIS in the Taiwanese government. He added that the informate application was directly related to the perceived effectiveness in decision and in service. Similarly, Prybutok et al. (2008) placed information quality as a building block in the IT quality triad they suggested in their tested e-Gov model. Bird and Zolt (2008) stressed that information produced by ICTs is faster, cleaner, and at the right time.

Information available to knowledge workers enhanced their ability to answer questions about tax related matters (Chatfield 2009) and made time for public workers to do other work (McKerchar and Evans 2009). However, other empirical studies showed that public workers were overloaded in their work due to the abundance of information and those actually overwhelmed employees and caused complaints (Segall et al. 1994). Other studies in Africa and the Middle East showed less significance of the use of ICT in information delivery (Pons 2004; Ciborra 2005). This study, and to identify whether ICT enhanced information quality and had direct perceived effect on employees' functionality on the job, suggested the third proposition 'ICT improved information quality'.

2.6.4: Proposition IV: ICT improved service delivery to citizens

Moon (2003) argued successfully the idea that ICT can restore public trust. Using four case studies in the United States and Korea, he was able to point out success stories of public trust restoration. West (2004) found out that even in the United States, the empirical evidence showed an uneven level of e-Gov services in different local governments and a low level of citizens' awareness of e-Gov services in low income areas. Ciborra (2005), working in one of the MENA countries, negated the idea that the intention of governments in such countries was to use ICT as improving service delivery to citizens, but rather as another means of controlling the public or even allowing countries to be run from abroad. The belief that ICT brings equity, responsiveness, efficiency and effectiveness as prescribed by Ramessur et al. (2008), was challenged in West's finding in a developed country and Ciborra's literature in a developing country. With the lack of empirical e-Gov work in the developing countries, the study's aim was to help to clear out this argument by exploring the Lebanese e-Gov efforts concerning service delivery. Hence, the fourth proposition: 'ICT improved service delivery to citizens'.

2.6.5: Proposition V: ICT has had a positive impact on the functioning of the Lebanese MoF

The use of ICT in the developing countries by employees in public organisations and in the revenue collection in particular, is thought to enhance employees' ability to speed up the work process, to improve public officials' abilities in managing their employees, and to improve tax collection techniques (Heeks and Stanforth 2007; Madon et al. 2004). Sophisticated ICTs promised more such benefits as in cross-checking taxpayers'

declarations for VAT compliance, persuading tax evaders to comply, eliminating or reducing citizen-employee contact to decrease bribery, better monitoring of trade volumes, and enhanced property evaluations for tax purposes (Bloomquist 2004).

However, the inappropriateness of such technologies (Schuppan 2008; Kefela 2009) and sometimes the outright failure of their applications in most of the developing world (Heeks 2003; Dada 2006) resulted in a limited impact. Investments in such technologies without cropping the benefits was seen as major drawback and waste of money (Gupta and Jana 2003; Ciborra 2005). Some literature argued that more work was required by employees instead of less (Segal et al. 1994); higher levels of education and training of employees was deemed needed to produce effective impact (Maumbe et al. 2008); and some even suggested that ICTs in the developing world is not even related to improvement in the work process but rather a tool for mere control of the population in the country (Ciborra 2005).

It is worth mentioning that the lack of academic exploration in the chosen research site and in the developing world in general, suggests the need to assess whether the impact of ICTs is positive, negative, or neutral. This study therefore seeks to assess what the current effects of ICT on the functioning of the Lebanese revenue department are. This intention is covered by the fifth proposition, 'ICT has had a positive impact on the functioning of the Lebanese MoF'

2.6.6: Proposition VI: ICT improved revenue generation at MoF

Studies pertaining to governments' revenue generation or Ministries of Finance in developing countries mostly supported the idea that ICT brings better outcome when applied. Lai et al. (2005), Vasconcellos and Rua (2005), and Chatfield (2009) found that the e-filing helped the tax administration in Malaysia, Brazil, and Japan, respectively. Their investigations of the three different countries showed reduction in administration cost, a drop in late filers and an increase in revenues by having people use the service to avoid standing in long lines in order to file their tax return. Gupta and Jana (2003) and Madon et al. (2004) investigated in India the effect of ICT on MoF and revenues from the modernisation effort and assumed positive impact when implementation was in a more mature juncture.

This investigation's main aim was to study the impact of ICT on the functioning of the MoF, hence assess the effectiveness of the newly installed system on the revenue generation. As previously mentioned, no known study has been conducted in the chosen site, hence the sixth preposition 'ICT improved revenue generation at MoF'.

2.6.7: Proposition VII: The level of success given by trajectory mapping technique has a direct causal effect on the impact of an EGIS

This study attempted to inspect three sets of results. Referring to the inability to transfer frameworks, the study re-adjusted Norris and Moon (2005) framework in order to try to make it fit the study in a developing country. Norris and Moon (2005) recommended the study of three stages to

assess the impact of ICT. The stages were organisational characteristics, organisational change, and organisational outcome and output.

In the newly suggested framework, and after following the suggestions by Evans and Yen (2005), which called for extra factors to be considered in an international setting and Gupta and Jana (2003), who recommended a precise identification of what to measure, the modified stages are suggested as: 1) Obtain the relative contextual factors and level of progress before any attempt to study the implementation of an EGIS. This is achieved by exploiting the trajectory mapping technique used earlier by Gasson (2006), Heeks and Stanforth (2007), and by Muganda-Ochara and Van Belle (2008). 2) Inspect the organisational change by evaluating the public employees' perceived EGIS benefits. Hence, expose the realistic transformation by inspecting the utilisation of the software by the users. 3) Gauge the output of the proposed EGIS by checking, using secondary data produced by the organisation, the possible causal effect of the EGIS on the revenue collection.

It is noteworthy that the three authors who used the trajectory mapping in inspecting ICT application stopped short from validating the degree of success given by the mapping technique. Picking up from where Gasson (2006), Heeks and Stanforth (2007) Muganda-Ochara and Van Belle (2008) left off, and after having the three different findings represented in the 'degree of EGIS success given after trajectory mapping', the 'perceived effectiveness of the EGIS by employees', and the 'actual revenue figures', a causal relationship is inspected between the trajectory mapping degree of success and the two other results, perceived effectiveness and raw revenue output. This intention is covered by the seventh proposition, 'The level of

success given by trajectory mapping technique has a direct causal effect on the impact of an EGIS’.

2.7.0: Conclusion

This chapter has provided an unpretentious review of the current relative literature to the research subject area of e-government and ICT impact on public organisations. This was achieved by discussing selected studies in terms of brief description, analysis, and critique of its contents and adopted theoretical and methodological groundwork. The chapter went further and expounded the theoretical framework selected for the study and provided explanation of how the seven propositions were obtained from the literature reviewed.

The chapter’s main aim was to present the relevant research efforts conducted thus far in order to identify gaps that currently exist, some of which this research effort intends to fill in order to move the frontiers of knowledge, in this subject area, forward. The study, however, recognises the turbulence in the business environment due to the rapid advancement of technology in the last two centuries. Therefore, the purpose of the study was to take stock of the situation, especially in the context of developing economies, rather than to provide a comprehensive solution. The study suggested a framework that may facilitate a periodic re-assessment of the impact of ICT on public organisations.

Having reviewed the relevant literature and suggested a theoretical framework for this study, the next chapter focused on the methodology that was chosen as best suitable to the research at hand.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0: Introduction

The literature review chapter mapped out the evolvement of studies on e-Gov and impact of ICTs in organisations. The intensive review conducted allowed the author to have the ability to identify, and comprehend current issues regarding e-Gov design, framework, implementation, and eventually the impact of such technologies in developing economies' public sector environment. The views, arguments, stands taken, methods used to investigate, and researchers' opinions were all listed and scrutinised. The various methodologies used in assessing the ICT impact varied considerably among authors. Furthermore, the second chapter gave the author the motivation to research for alternative methods to understand ICT impacts on public organisations from a different perspective, such as the study of trajectory mapping of an EGIS and the correlation of this method with the perceived effectiveness by public employees of the EGIS.

This chapter aims to illustrate the procedure involved to attain the needed goals from this research study. The intention is to guide readers through the steps conducted in this thesis, meanwhile, provide a comprehensive understanding of the specific methodology adopted by this dissertation. Hence, this is a brief talk about the research philosophy, type of research, research approach, and strategy implementation, as well as the data collection and the sampling methods. Furthermore, the validity and reliability of the data and the limitations of the methodology used which is significant for determining the final consequence of this research study, is explained.

To that end, an overall view of the research process and why the chosen multi-method methodology was used in this research is provided in the following sub-sections.

3.1.0: Research Philosophy

The goals of a research and the nature of the research topic influence and sometimes dictate the selection of a research strategy and philosophy (Benbasat et al. 1987). In the first stage of deciding the route to conduct a research, a research philosophy has to be considered by the researcher. There are two principle philosophies which are different from one another due to their different epistemological and ontological methodology. These conceptions are helpful to understand the theoretical underpinnings of different approaches to research. This will scrutinise the data collection, the analysis, and leads the findings, accordingly, to logical conclusions. The two main philosophies in social research are briefly described below.

The 'Positivism philosophy' (also known as quantitative, scientific or objectivism) is based on notions of objectivity by the researcher. It adopts scientific methods from nature science, and its purpose is to generate hypothesis and test them. Knowledge is arrived at through the gathering of facts. The assumptions would be to generalise and replicate the outcome of the research (Zikmund 2002; Bryman and Bell 2003).

The 'Interpretivism philosophy' (otherwise referred to as qualitative, interpretivism, phenomenology, or social construction) is an alternative to positivist orthodoxy. The main concept is that social scientists must capture the social reality and perspectives of individuals and groups within society.

Since their ideas and situations are all unique and influenced by individual status and outside factors, each case needs to be studied carefully and then researchers can see the clear pictures behind them. Thus, it emphasizes on details rather than generalisation (Zikmund 2002; Mingers 2003).

However, it is fair to say that both mentioned philosophies have their shortcomings and to that end, it can be argued that combining both philosophies could lessen some of each individual shortcoming and actually enhance the findings by the researcher (Mason 2006). Mingers (2003) contended: 'there tends to be a belief that the two [quantitative and qualitative] cannot be mixed because of their underlying paradigms' (p. 236), yet in conducting social research, the two main philosophies [positivism and interpretivism] 'are not actually two diametrically opposed camps' (Denscombe 2002, p. 22). It is fair to say that despite the lack of theory that combines both approaches, researchers are more interested in picking up and choosing 'what fits' in order to achieve the most robust and valuable findings (Denscombe 2002). Denscombe added 'the guiding principle for research is not how well it sticks to its 'positivist' or 'interpretivist' epistemology, but how well it addresses the topic it is investigating' (P. 23). Bryman and Bell (2003) weighed in their acceptance to the mixed-method approach where they mentioned that the current view within social research is that the two are mutually informing.

In this study, two distinct researches were conducted. The first sited the perceived impact of the EGIS programme on the Lebanese MoF by the managers and officials in the ministry. This part of the research required an interpretivism approach as an epistemological orientation. The narration by the actors constructed the "truths" about the EGIS genealogy. This part

indeed followed social construction as the ontological orientation. Narrative analysis was used to extract the stories told, then they were analysed to bring out patterns by different actors. Two distinct stories or “truths” emerged from the two opposing political parties involved, one by the pro-automation of the MoF claiming that the EGIS application and design is a great success story for other to follow and an opposing party claimed truth by the anti-automation actors which stated that the EGIS was a complete failure and a great breach of security.

The author, being a critical realist, was baffled by the truths obtained and the different accounts of each group had about the same EGIS programme. Thus, the author wanted to reconcile the “truths” obtained and justify where the absolute truth lies. This substantiated the need for the second phase of the research - “the perceived effectiveness of the EGIS programme by the technology users”. With the two different accounts of the organisations’ benefits delivered by the EGIS, an objective look at the end result was sought after.

Did the organisation benefit from the EGIS programme running or not? Since the knowledge workers were the users of such technology, gauging their perception would shed a light on the conflicting views/results obtained from the first phase of this investigation. In this particular phase, positivism was the epistemological orientation where large number of employees were surveyed (ontological orientation) and employees’ responses were fed into SPSS software in order to see the emerging patterns. The following subsection will provide a more elaborate classification of the use of the two different methodologies.

3.1.1: Mixed Methods in IS Investigations

In conducting IS research in the early days, Benbasat et al. (1987) alluded to the dissatisfaction with the solo use of quantitative techniques in IS investigations due many reasons. Firstly, the different stakeholders involved in the production and implementation of an IS project and the complexity of the subject matter requires an in depth study not entertained by a quantitative investigation (Mason et al. 2004). Secondly, the need to have a large sample size (Bryman and Bell 2003) in such endeavour which might not be available in every IS investigation setting (Heeks and Stanforth 2007). Thirdly, the difficulty in understanding the results produced in a quantitative study (Benbasat et al. 1987) renders this method as inconclusive in a social research venture. On a positive note however, using quantitative techniques may help to achieve external validity, generalisability and find causality between dependent and independent variables in a very objective manner (Denscombe 2002). Yet again, social research might not be inclined to generalise findings but rather in need to understand a social phenomenon that belongs to a certain locale.

Contrary to discontent of use of positivist investigations cited by Benbasat et al. (1987), Chen and Hirschheim (2004) reviewed 1893 academic articles investigating IS methodology used between 1991 and 2001 and concluded that positivist research still dominated the studies (81%) and the method of survey was found to be widely used (41%). They discovered, however, that case study design was on the rise (36%) and there exists an increase in the qualitative venue (30%) when investigating IS related research. The review presented by Chen and Hirschheim was a bit old according to IS time standards. IS related changes are constantly varying every two years due to advancement in such technologies (Haag et al. 2006); the last ten years saw

the most significant transformation of different technologies, hence the need to re-assert older findings.

This study reviewed several (37) recent (post year 2000) IS related articles, as noted in the literature review chapter, and found out that positivist investigation were utilised by some scholars (13.5%) such as: Lai et al. (2005), Norris and Moon (2005), Wang and Liao (2008), Prybutok (2008), while the majority (43.3%) resorting to socio-technical research required deeper knowledge and detailed information to understand the phenomenon in its specific context (Bryman and Bell 2003), deployed qualitative techniques such as interviews, contextual, narrative, documentation content analysis, observation, hermeneutics, and even ethnography. For example: Layne and Lee (2001), Moon (2003), Madon et al. (2004), Ciborra (2005), Al-Shehry et al. (2006), Ojedokun and Moahi (2006), Gasson (2006), Heeks and Stanforth (2007), Elsheikh et al. (2008), Chen et al. (2009), Muganda-Ochara and Van Belle (2008), Ramessur et al. (2008), Chan and Pan (2008), Kim et al. (2009), Schuppan (2009), Velsen et al. (2009). Similar to the quantitative technique shortcomings, there are limitations in using qualitative techniques in a solo manner. Objectivity can be questioned and the interpretation of the subject under investigation could be explained by the eyes of the researcher and not in its reality (Cordella and Sheikh 2003). Another drawback in qualitative strategy is the in-ability to generalise the findings on a large scale. Hence, the idea of combining the two philosophies to reduce their individual weaknesses (Gil-Garcia 2005) was attractive to some of the reviewed IS articles (16%) such as: Gupta and Jana (2003), West (2004), Tseng (2008), Koh et al. (2008), Batini et al. (2009), Azad and Faraj (2009).

This study, being exploratory in nature, investigated a research site in a developing country with substantial political turmoil, which has not been academically examined before. The very few people in the leadership and management level in the public organisation under study, and in order to ascertain the trajectory taken by the e-Gov genealogy track necessitated a one on one interview to obtain valuable contextual information. The thorough examination of the documents supplied by the management, the reports by external advisors, and the MoF website review required thorough analysis of secondary data. These two above mentioned techniques in data collection and analysis coupled with the researcher's own observation at the Ministry during the length of this study and a previous study conducted in 2004, as a one of the requirements for his MBA thesis, necessitated the phenomenology paradigm as a philosophical underpinning.

With gained knowledge from the first stage of the investigation, the study needed to cross check these findings by estimating the ICTs employees' perceived impact and the actual obtained improvement in tax collection attributed to ICTs deployment. This effort of collecting opinions, dealt with a totally different population sample, the ICT users (employees at the MoF). Resorting to qualitative techniques was seen as inappropriate due to the large size of technology users at the Ministry. A more incorporating methodology was sought. For that reason a questionnaire was designed, design-enriched by the feedback obtained from the first stage of the investigation, and dispensed to gauge the perceived impact of the ICT mediated efforts. Surveying a large sample of employees with a closed ended questionnaire type is a form of positivist methodology.

This venue of combining methods has not been completely discredited by IS scholars. Despite how scarcely used in the field (Mingers 2003); mixed methodology was proclaimed as furnishing richer conclusions in investigating IT related research that is smeared by the complexity of the subject matter, the presence of multiple stakeholders, and different stages present in such endeavour (Mingers 2001, 2003; Bazeley 2002; Bryman and Bell 2003; Tobin and Begley 2004; Gil-Garcia 2005; Creswell et al. 2006; Mason 2006; Gil-Garcia and Pardo 2006).

Accordingly, Creswell (2003) suggested four different strategies that can be followed in combining methodologies depending on the aim of the research. Creswell suggested two different strategies: namely sequential, where one method is used first and based on its results the second method is deployed to extend or clarify the findings from the first, or concurrent, where several research methods are enacted simultaneously.

These strategies are summarised in the following table:

| Table 1. Multi-Method Strategies and Designs | |
|---|--|
| Sequential Strategies | |
| <u>Explanatory Design:</u> | QUAN => qual |
| <u>Exploratory Design:</u> | QUAL => quan |
| Concurrent Strategies | |
| <u>Triangulation:</u> | QUAN QUAL |
| <u>Nested:</u> | QUAN <=> Qual is embedded QUAL <=> Quan is embedded |

Table 3.1: Adopted from Creswell (2003)

Some IT literature that adopted the combination of both paradigms were seeking triangulation (Heeks and Stanforth 2007). Triangulation is mostly useful when low response rate from a survey is anticipated (Bryman and Bell 2003), or when one source of data is needed to corroborate data from another source (Tobin and Begley 2004), or when the reduction of researcher's bias in an investigation is a concern. Mingers (2001) affirmed the triangulation usage when he mentioned that the IS researcher, and to consolidate data collection, resorts to other means of data collection to enrich the research and confirms the findings from different perspectives. Tobin and Begley (2004) listed various types of triangulation as described in research methodology literature: data triangulation (using different methods to collect data); investigator triangulation (more than one investigator examining the same subject); theoretical triangulation (borrowing models from other disciplines); and methodological triangulation (combining more than one paradigm). In explaining what real triangulation is, Tobin and Begley (2004) posited: 'if real triangulation is to occur, each approach (qualitative and quantitative) must be equally valued' (P. 393).

In light of that, and since the research aim was to examine the propositions suggested in the previous chapter, the study did not seek triangulation per se for the mere reason that the population sample used (management and employees) in the two methodologies were different and the two methods used were not equally valued. This exploratory research followed what is referred to as a sequential strategy conforming to Creswell's (2003) school of thought, by using qualitative technique as a first primary stage, followed by a complementary stage using the quantitative methods. It could be said that various data collected were being analysed and checked to ascertain if they converged (triangulated), diverged, or did not have any mutual

mapping at all. Therefore, despite the various data collection and the theoretical triangulation used, triangulation of the findings was examined but not sought by this study. In other words, the study was rather, a 'mixed methodology in a qualitative driven way' as prescribed by Mason (2006) when she described the form of mixed methodology with accented qualitative flavour as:

'Mixed methods therefore offer enormous potential for exploring new dimensions of experience in social life, and intersections between these. It can encourage researchers to see differently, or to think outside the box, if they are willing to approach research problems with an innovative and creative palette of methods of data generation. This palette could certainly include, for example, the 'qualitative standards' of semi-structured interviewing, observation and textual analysis, and the 'quantitative standards' of social surveys, demographic or economic data collection and analysis'.

Therefore, the philosophical underpinning is a combination of the two different paradigms, positivism and phenomenology. This study, and following the pragmatic stance of the author, used a theory (ANT) that calls for a relativist ontology as a theoretical underpinning in the first stage of the research, believes that pragmatism increasingly overrule purity in choosing paradigms (Bazeley 2002). Mixing methods is in conformity with the 'multi-framework' (Bazeley 2002; Mason 2006; Creswell 2003) as adopted in this study in which ANT constructs and Orlikowski (1992) 'Model of Technology' were utilised as discussed in the previous chapter. The need to use both methods stemmed from the aim of this research in trying to conduct a holistic design that required an integration of methods in contrast to the simpler component design (Bazeley 2002). Hence, the objective here is to gain the benefits of both types of investigations and overcome the weakness posed by either individual method. Again, this philosophy is well suited for

the sequential nature of the current conducted investigation; this is well corroborated as Bazeley (2002) posited:

‘Where the purpose of the research is made clear, and is theory-driven then that substantive focus becomes a super-ordinate goal which limits tensions in mixing of methods. Much of the writing about mixed methods designs has focused on the use of component (parallel or sequential) designs in which the different elements are kept separate, thus allowing each element to be true to its own paradigmatic and design requirements (but raising the issue of whether, in such cases, these really do constitute a mixed methods study or rather, are two separate studies which happen to be about the same topic)’ (P. 3).

And by Mason (2006) who took the similar stance:

If we are to use mixed methods to triangulate, or to corroborate each other, then this suggests an integrated framework, where we use each method and form of data to tell us about a specific part of the ‘picture’, or to provide views of ‘the picture’ from specified angles. The overall logic here would be that these parts or views can be consolidated, or integrated to produce a fuller or more valid or robust picture. This model for integrating methods and data requires one overarching theory, or set of questions, and one coherent world view of how it is possible to conceptualise ‘the picture’, so that the pieces can be assembled. (P. 20)

By clearing up the philosophy pursued throughout this research, a split and classification of the propositions, to different stages of the research

conducted, is deemed necessary in order to demonstrate to the reader the global picture of the design process.

3.2.0: Research Propositions

The research propositions were listed in the first chapter of the study and were scrutinised through the gaps retrieved from the second chapter to arrive at seven propositions which constitute the contributions claimed by this study. These propositions are grouped into three sections as shown below:

3.2.1: Section A: Trajectory mapping desired benefits

- I. Trajectory mapping of an e-Gov effort exposes the relative contextual factors involved and benchmarks the EGIS success
- II. Trajectory mapping is a useful tool in identifying and listing EGISs and exposes their current status of deployment

3.2.2: Section B: ICT impact pragmatic assessment in the MoF

- III. ICT improved information quality
- IV. ICT improved service delivery to citizens
- V. ICT has had a positive impact on the functioning of the Lebanese MoF
- VI. ICT improved revenue generation at MoF

3.2.3: Section C: The relationship between trajectory mapping and the ICT impact

VII. The level of success given by trajectory mapping technique has a direct causal effect on the impact of an EGIS

Looking at the three proposition sections, it can be noticed that the first set of proposition deals with mapping out the efforts conducted by the government in creating the e-Gov projects at the said Ministry. In the two propositions suggested the author is trying to emphasise on the ways in which the individuals or the actors interpret their social surrounding and create what is called their social reality. It is well known that these realities differ between individuals and groups based on many factors. The aim of the propositions is to expose those factors that could impact the outcome of the EGIS understudy. This requires deep understanding of the mindset of the groups or individuals involved. The scientific approach or quantitative would need the basic knowledge of the efforts conducted in the research site in order to develop research instruments. With the acknowledgement of the Lebanese officials that the site has never been researched, facts or data to establish any sort of research instrument for a quantitative investigation is just not there. Finding out who is involved in the effort and telling the story behind going digital in the Ministry of Finance required a more one on one approach in order to get to the bottom of how things evolved. This can be arguably achieved by trying to understand in depth the belief of each group involved and a case study requiring a qualitative approach was seen as fit for the first set of propositions (I and II).

With the information gathered in what was denoted as phase one, phase two of the field work could be conducted. Propositions in section B dealt with ascertaining the knowledge gained by employees vis-a-vis computer offered information and the way employees used it to gain a competitive advantage at work. In this situation, a large number of individuals had to be

questioned. The targeted employees worked at three different locations under different departments. Interviewing them to assess their improvement at work required a more generic method with extreme objectivity. The conditions called for a quantitative approach to evaluate this set of four propositions. Using the information gathered from the first qualitative phase enabled the author to develop a questionnaire arguably suitable for the employees in the second phase.

Proposition seven was evaluated by comparing and contrasting results obtained from the two phases and with information retrieved from the IMF archives about Lebanon and its financials.

The above listed propositions were further simplified and enlisted as questions in a questionnaire (appendix A) and various interview questions (appendix B).

3.3.0: Research design

It is considered as one of the most important aspects in linking the abstract and data collected with the chosen empirical model (Bryman and Bell 2003). Therefore, the research design purpose is to identify the methods used, the techniques and strategies that will help in analysing through the empirical research in order to answer the research propositions defined earlier.

The following sub-sections explain the research strategy, data collection methods, research instruments, the pilot study, and data analysis followed.

3.3.1.0: Research Strategy: Case Study Followed by a Survey Approach

Research strategy is an organised way of collecting information. In other words, it is a summary of how to go about finding facts from the study being conducted. It is more like a framework, an overall assumed design, a suggestive plan, that encompasses all the objectives, the data sources, and an explanation to the limitations of the research taking place (Saunders et al. 2003).

In order to understand the impact of ICT on the functioning of a public financial institution holistically, two different approaches were needed. The first approach, and in order to be able to map the trajectory of the e-Gov effort, a longitudinal analysis was deemed suitable. In addition, the focus on one division (Directorate of Revenue) in a specific Ministry (MoF), in a developing country (Lebanon) warranted an approach that can encompass a thorough, in-depth investigation for this phase of the project. This particular research site (MoF) was selected because it was chosen by the Lebanese government as the pilot stage in a general rehabilitation process in the modernisation of the public administration plan after the country's civil strife ended in 1990. From the 1990's on, political wrangling, the country's debt situation, ICT periodical on and off support, war with Israel in 2006, the role of international agencies and NGO's, and sharp divisions in the administration developed a rare mix of factors that made the study rich. Due to the peculiarities of the site and the country's situation, a case study

approach was deemed suitable to examine the first set (section 3.2.1) of the research propositions listed above.

Consequently, and in order to sample the ICT users at the MoF, data collection from a larger population was required. The study resorted to a survey approach to enable the author to evaluate the perceived effectiveness of the generated software in all departments in the Lebanese Revenue Directorate. An explanation for both approaches is discussed in the next sub-sections.

3.3.1.1: Case Study Approach

This study uses a case study approach as a vehicle to collect in-depth data. With no strict meaning to a case study a definition that explains the case underway, appropriate with the theory, framework, and methodology selected, is chosen that of Benbasat et al. (1987): 'A case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or few entities (people, groups, or organisation)' (p. 370).

The ICT project in the Ministry of Finance (MoF) has been developing since 1994 and is still unfolding. The country of Lebanon has 18 religious groups with a unique political system in the region that is publically known to allow these different groups to share power and public posts based on each groups' population size rather than on merits of individuals. This uniqueness in the political system and governmental posts allocation necessitated, as seen by this study, for the need to have a thorough examination of the milestones, the contingent factors involved the projects' trajectories, and the

relationships between local and global actors. That was deemed as crucial to understand the project's evolution. An in-depth look at the different stages and progress that the project went through, therefore, required meticulous data analysis and understanding within the project's context. The need to collect data from different actors involved (local and international) required multiple interviews for data collection from actors in their natural surroundings. A case study approach was seen as adequate for such an endeavour. This approach is not novel in the academic world as other scholars such as Madon et al. (2004) who used a case study to understand an ICT application impact in India and Heeks and Stanforth (2007) who successfully used the case study approach in mapping the trajectory of the integrated financial system and place a level of success on the e-Gov effort in the Sri Lankan MoF which is very similar to this attempt.

3.3.1.2: Qualitative Data Collection

Concerning data collection in a case study, there exist 'six sources of evidence' that can be utilised. Yin (2003) listed them as: 'Examining documentations, archival records, interviews, direct observations, participant observations, and physical artefacts' (p. 86). Yin's sources are sought to be in line with the needed data collection for the stages of this study.

Un-structured Interviews:

Initial data was collected by the use of one-on-one unstructured interviews to probe the MoF and gather information about the Ministry, the work process, the structure, and networks involved. Those initial interviews were with the Chief Information Officer (CIO), three UNDP custom head-advisors, three directors of the main divisions (Tax, VAT, and Customs), and the

general director of the Ministry of Finance. All interviews conducted throughout the research were tape-recorded after securing permission from the interviewees. Other informal interviews were conducted, during the wait period to see high ranking officials, and were with mid-level managers such as the deputy human resource manager, human resource manager, archive's personnel, and ex-managers, though retired, but still visit their friends in the Ministry. The ex-managers informal views were rich in information and free from restriction posed by any fear of retribution by higher Ministry officials for giving out information.

Semi-Structured Interviews:

Data collected from top management enabled the researcher to design a questionnaire to utilise in the next set of interviews. Semi-structured interviews were conducted using the organisation as the unit analysis, yet observations were done at the individual level. A total of fifteen interviews were conducted during a 9 month period. The interviewees were carefully selected due to their sensitive position in the Ministry and their deep knowledge of the MoF's history. The semi-structured interview questionnaire contained 40 questions that revolved around the history of the ICT introduction, the leadership present, the change agent, the organisation work process, the political wrangling, the institutional environment, and the power struggle in the different departments. Other key informants such as: technical assistants, change agents, software developers, and modernisation implementation teams were interviewed in order to complement the responses obtained from initial stage of interviews.

Narrative analysis:

The interviews conducted produced a lot of data in the form of stories that required analysis to recognise patterns and make sense of all the stories told. Larsson and Sjoblom (2010) explained that narrative analysis (NA) attempts to understand and represent experiences through the stories that individuals live and tell, this will in turn help in answering the questions of meaning, experience and social significance.

NA utilised in chapter four allowed the reader to understand the deep struggle of communities' members within the working force at the MoF in regard to the EGIS programme during implementation.

Document analysis:

The researcher received several publications from interviewees during the interview process to support each interviewee's point of view. In addition, unpublished reports by international trainers and technical assistants were sought and obtained from the Ministry's internal documents vault. In addition, brochures, public documentations, and internal employees' hand-outs were all used as secondary data in the collection procedure.

Observations:

Observations by the researcher during the elongated stays at the research site were logged immediately after the visits were conducted.

This multiple use of data gathering allowed for the understanding of the local and global network actors and provided triangulation in data collection.

This is consistent with ANT related field work (Madon et al. 2004). The different sources enabled the researcher to gather enough information to process and analyse for the ultimate goal of identifying contextual factors, list the programs or software adopted by the MoF, expose the intended users of ICTs, and to ascertain the extent of implementation success of such e-Gov tools at the Ministry. Furthermore, a degree of e-Gov success, determined by plotting the EGIS trajectory, was determined similar to work conducted by Heeks and Stanforth (2007). With such data collection techniques using interviews, observations, document and narrative analysis, the author was able to satisfy the first section of the propositions, namely proposition I and II, denoted in section A (3.2.1). As for proposition VI, documents obtained from the MoF were analysed and their contents reassured with interviews, then after statistical analysis, some conclusions were drawn regarding the impact of ICT on revenue generation. To that end, data obtained from phase one enabled the researcher to design and develop the second research instrument needed in the next phase: the questionnaire survey.

Survey approach was seen as an appropriate objective tool to measure the employees' perceived effectiveness and hence, was utilised in the second phase of the data collection process.

3.3.2.0: The Survey Approach

The need to obtain an objective view of the utilised software in the Ministry was viewed by the study as extremely crucial in cross checking the results (success or failure) rate given by the trajectory method. In addition, assessing the relevance of the contextual factors and the ICT impact on the functioning of the MoF required an inspection of employees' perceived

effectiveness of such programs developed by another department. Zikmund (1997) explained the survey approach as: 'a method of primary data collection based on communication with a representative sample of individuals...it requires asking people, respondents, for information using either written or verbal questioning' (P. 56). Due to the fair amount of employees at the MoF (1500), their different work locations, and the need to gather standardised data without the need to have a face-to-face meeting with each individual, a questionnaire survey was deemed the most appropriate venue to select (Denscombe 2005). With that choice however, the burden shifts to the development and design of such a research instrument. In the next sub-section the process of arriving at the final questionnaire form is explained.

3.3.2.1: Development of the Questionnaire Survey

The process of the questionnaire design stemmed from the contextual factors exposed by the first phase of the study and the four research propositions outlined in section 3.2.2. The weight of the discovered contextual factors and their relevance in affecting the impact of the EGIS was put to the test in the questionnaire design process. Consequently, the first three of the four propositions revealed in section 3.3.3 that attempt to inspect the effectiveness of the functional EGIS programs were translated into specific questions.

As outlined in the previous chapter, Orlikowski's (1992) model of technology called for the use of relevant (exposed from the initial phase of the research) contextual factors as the independent variables, an informate application (suggested by Zuboff 1988 and used by Tseng 2008) as a mediating variable and finally the items used in the perceived effectiveness

construct as the dependent variables. A guiding framework was developed as shown in the figure below to steer the inquiry and direct the questioning efforts:

Contextual factors Use of e-Gov applications Perceived Impact

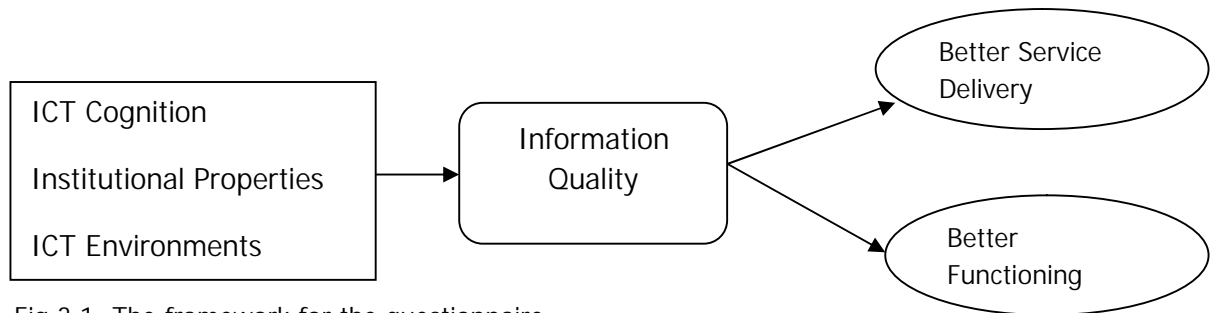


Fig 3.1: The framework for the questionnaire

With that mentioned, the questionnaire was divided into five main sections. Section A (General Information) contained 10 questions that dealt with the collection of basic information about the respondents and their corresponding organisations. The following sections (factors' relevance) were aimed at surveying the employees' ability to identify with the three contextual factors and their impact on the informate application. The three factors, ICT Cognition, Institutional properties, and ICT Environments were assessed by 6 questions each in sections B, C, and D, respectively.

Section E was comprised of 6 questions and was aimed at appraising proposition III Information Quality produced by the e-Gov functioning software applications in the Ministry. The quality of the information was considered as the mediating variable to the impact of ICT on the Ministry. Finally, sections F (5 questions) and G (7 questions) were aimed at understanding the perceived impact of such Information Quality on the

Functioning of the MoF (proposition IV) and on Service Delivery (proposition V). The questionnaire consisted of 46 questions in total. They were divided and designed to discover the appropriateness of the contextual factors identified in the previous phase and to probe into the three propositions, namely: III, IV, and V. The table below shows the allocation of the questions to the propositions:

| Contextual Factors | Question Number | Source of the question before modification |
|--|-----------------|--|
| <u>ICT Cognition:</u> | | |
| B1: If I heard about a new information technology, I would look for ways to experiment with it | B1-B3 | Yi et al. (2006) |
| B2: Among my peers, I am usually the first to try out new information technology | B4-B6 | Tseng (2008) |
| B3: I like to experiment with new ICT | | |
| B4: I think ICT can decrease bureaucracy | | |
| B5: I think ICT can promote fulfilment at work | | |
| B6: I think ICT can foster social development | | |
| <u>Institutional Properties:</u> | | |
| C1: I believe that top management in our organization supports the ICT app. | C1-C2 | Tseng (2008) |
| C2: Our organisation offers various types of ICT training programs | C3 | Researcher (2012) |
| C3: The training programs conducted were job related | C4-C5 | Tseng (2008) |
| C4: Our organisation appraises ICT literacy of employees | C6 | Researcher (2012) |
| C5: Our organization evaluates the ICT applications that we work with regularly | | |
| C6: Our ICT service desk does a great job in answering ICT related problems | | |
| <u>ICT Environments:</u> | | |
| D1: I am satisfied with the reliability of the system. | D1-D3 | Prybutok et al. (2008) |
| D2: I am satisfied with the system's ease of use. | D4-D6 | Tseng (2008) |
| D3: I am satisfied that the system is always accessible. | | |
| D4: I am satisfied with the system's packaged | | |

| software. D5: I am satisfied with the system's processing speed. D6: I am satisfied with the system's network environment | | |
|---|-------------------------|---|
| Propositions | Question Number | Source of the questions before modification |
| <u>Proposition III:</u> <u>ICT improved information quality</u> E1: I believe using ICT provided information that is useful to me. E2: I believe using ICT provided information that is accurate E3: I believe using ICT provided information that is at the right time E4: I believe our ICT personnel understand our business functions E5: I believe our ICT personnel understand the organisation's policies and laws E6: I believe our ICT personnel are free to assist users when needed | E1 E2-E3 E4-E6 | Lai et al. (2005) Prybutok et al. (2008) Byrd and Turner (2000) |
| <u>Proposition IV:</u> <u>ICT improved service delivery to citizens</u> F1: After deploying ICTs at work, our transparency had improved F2: After deploying ICTs at work, we can increase public participation F3: The Ministry of Finance's website has good information about all tax procedures F4: After deploying ICTs at work, we can service customers much faster F5: After deploying ICTs at work, we can deliver tailored services to citizens | F1-F2 F3-F4 F5 | Tseng (2008) Researcher (2012) Tseng (2008) |
| <u>Proposition V:</u> <u>ICT has had a positive impact on the functioning of the Lebanese MoF</u> G1: I believe ICT increased job productivity G2: I believe ICT enabled me to do my job more quickly. G3: I believe ICT improved my judgment at work G4: I believe ICT reduced our interaction with citizens due to the web offered services G5: The web information reduced my work as a tax advisor G6: Putting all the tax material on the web was a good taxpayer teaching tool | G1-G2 G3-G4 G5-G7 | Lai et al. (2005) Tseng (2008) Researcher (2011) |

| | | |
|--|--|--|
| G7: I believe ICT has reduced my overall work load | | |
|--|--|--|

A pilot study was conducted to refine the research instrument as explained in the next sub-section.

3.3.2.2: The Pilot Study

A first draft of the questionnaire was distributed to a number of colleagues and experts for their feedback: Dr. Kamil Omoteso and Mr. Ashok Patel from DeMontfort University in the UK; Dr. Elie Menassa from University of Balamand and Dr. Fida Afiouny from the American University of Beirut in Lebanon; and Dr. Naser Taleb from Al-Ain University in UAE were all asked to kindly give their feedback and comments about the proposed questionnaire. Their well-informed opinions have helped in reshaping the design in a way to make sure that the structure was relevant and clear with respect to interviewees.

After the refinement process, the questionnaire was translated into Arabic (the local language of the employees) and a pilot survey was performed to further examine the feasibility of the questionnaire and its appropriateness. This exercise was performed on fifty civil servants in the Tripoli (North Lebanon) MoF municipality. The pilot study showed an adequate design for the targeted population, yet also exposed some needed changes in the wordings of some questions. In addition, it identified a couple of double questions that were present; this problem was rectified in the final version (see appendix A) of the questionnaire survey. Remarks by the pilot sample group surveyed (10% of the total sample estimated) validated the questionnaire content and concept.

Therefore, the pilot survey served its purpose and eliminated the undetected flaws in the asked questions. In addition, it provided feedback on the overall design of the questionnaire as a research instrument.

3.3.2.3: Scaling and Purposive Sampling

Scaling: The responses were rated based on a five categories Likert scale (Denscombe 2005). This method was used to allow the wide range of responses to be entered. The respondents can answer each question with the five choices provided which are: strongly agree; agree; un-decided; disagree, and strongly disagree (SA, A, U, D, SD). Providing the five choices was believed by this study to be the most beneficial.

In order to ascertain and objectively analyse employees' perceived ICT impact, the study decided on resorting to a non-probability sampling technique. It can be argued that Purposive sampling is best suited for this research because only the identified users of the technology are the ones that could produce the data (Denscombe 2005). Including all employees in the survey (ICT users or not) would have increased the disqualified returned questionnaires and in turn wasted funds. In order to participate in the study, an employee in the three significant taxation offices must have a full time position and be equipped with a PC or have some form of ICT connection and use. The three sites, out of five, were singled out due to the feedback and actual figures provided by Ministry officials claiming insignificance of revenues generated by the two ignored offices located in the Bekaa valley and the South of the country respectively and their lack of office automation.

In total (495) structured questionnaires were administered to the targeted population, of which 140 were printed and distributed by hand to each individual (in Tripoli), while the rest were e-mailed by the revenue directorate chief to all revenue employees in the Greater Beirut area which included the large taxation office unit (LTU), newly established, and the Mount of Lebanon offices with a request to print and fill the form and deliver back to the chief in a period of 7 calendar days. 358 were returned (72.3%) and 332 were usable due to some omissions on 26 questionnaires which rendered them unusable giving a response rate of (67%). Table 3.2 below illustrates the response rate in the three different tax offices of Tripoli, Beirut, and Mount-Lebanon. An overall design block diagram is presented in the next sub-section to sum up the entire research process.

| Tax Office | No. of questions sent | No. of questions returned | No. of questions usable | Response rate |
|---------------|-----------------------|---------------------------|-------------------------|---------------|
| Tripoli | 140 | 86 | 80 | 57.14% |
| Beirut | 190 | 157 | 150 | 78.9% |
| Mount Lebanon | 165 | 115 | 102 | 61.81% |
| Total | 495 | 358 | 332 | 67% |

Table 3.2: Questionnaires' response rate from individual offices

3.3.2.4: Data Analysis

Following data collection, the first task was to cleanse and code the data collected. The data gathered from the interviews that were in the form of tape records were dated and notes were attached to each tape file indicating the researcher's observations from every interview. In transcribing

the tapes, analyses were added based on the voice tone, facial expressions, choice of words, and viewpoint based on the interviewee affiliations.

On the questionnaire side, the data obtained was cleansed from unusable forms due to missing data and sometimes missing pages from the questionnaire due to employee error in printing the questionnaire received by mail. The data was then input and analysed through the use of SPSS to produce both Univariate and Bivariate analyses in the form of frequency tables, Cronbach's alpha coefficient, exploratory factor analysis, factor analysis, and regression analysis. Frequency tables provided figures for the 'what' aspect of a research question while Cronbach's alpha coefficient validated obtained data to questions posed to employees hence, eliminating vague set of measures (items or questions). Exploratory factor analysis and factor analysis, on the other hand, were used to extract the relevant or common factors variances from the different set of questions proposed in the model (Kerlinger 1973). Finally, regression analysis was used to inspect the validity of the model and obtaining a coefficient showing the contribution of the independent variable on the dependent variable. The five descriptive and analysis methods were the main techniques adopted by the study to arrive at conclusions based on responses to the Likert scale questions.

Despite the fact that the questions on the questionnaire were mostly validated in previous studies, applying the same questions in the chosen research site needed validation to the particular sample of Lebanese workers. Therefore, statistics from the first analysis stage (frequency tables) gave the composition of employees, numbers, gender, status in the company, tenure, and education. To validate the questions posed a tool was needed to make sure that all the questions or items of the scale used

corresponded to the factor it was supposed to represent. Cronbach's Alpha was used due to its ability to drop any of the items that the respondents felt did not belong to the supposed factor. The six factor model developed required a method to validate its applicability in the context of the Lebanese site. The fact that factor analysis is useful in determining the underlying nature and number of the variable among large number of measures (Kerlinger 1973) made it an attractive venue by the researcher.

In later stages of the analysis of the data, factor analysis proved to be useful during quantitative data analysis as it helped in strengthening the model by transforming some of the items from one factor to another based on the loads given by the factor analysis method. This in turn, was extremely helpful in the analysis of each and every factor in the new reformed model. The conclusion formed by the analysis was also aided by the descriptive statistics given by the frequency tables generated by SPSS software. This will become obvious to the reader in the 'data analysis and interpretation' section of chapters five and six.

More statistical analyses were needed to strengthen and validate the model proposed. Referring to the model, the three contextual factors (ICT cognition, Institutional properties, and ICT environments) are supposed to describe the mediating variable (better information quality). After data collection, this part of the model required more analysis to show who contributed more to the mediating variable out of the three contextual factors. A mathematical method was sought after and regression analysis was seen by the author as the proper choice due to its ability to produce a form of equation where the independent variable is explained by loads generated to each independent variable as shown in the example below:

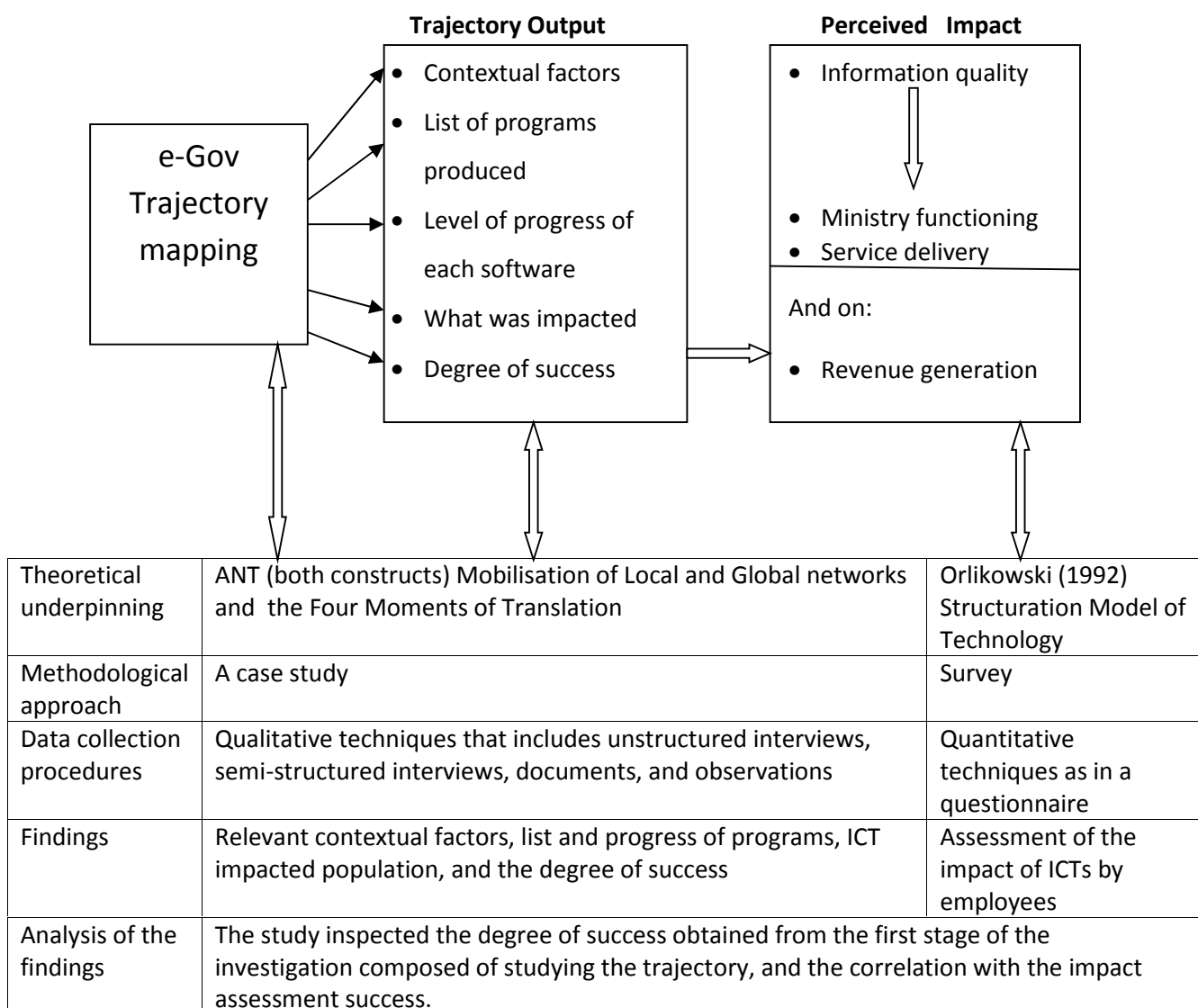
$$Y = a X_1 + b X_2 + c X_3 + \acute{\epsilon}$$

Finally, document analysis from the Ministry, the International Monetary Fund (IMF), the worldwide web, and the Finance Ministry's document library were used to corroborate the output from both phases of the research. All these sources provided the researcher with a broader understanding of the subject matter and aided in contextualising the data obtained from the many sources in a way that will be adequate for sound analysis as well as suitable theoretical engagement.

3.3.3: The Overall Research Design

Framework for a Holistic ICT Impact Assessment

MoF (Revenue Directorate)



3.4.0: Ethical Considerations

The one-on-one interviews conducted were all tape-recorded as mentioned before. Anonymity was breached by such a technique; therefore confidentiality had to be insured to the people who participated in them. Hence, the identities of the participants were kept confidential due to the sensitivity of the matter politically and from the organisational point of view. After the transcripts of the interviews were written down, transcribed materials were returned back to the interviewee for revision in order to ensure the accuracy of processes of transcription and the validity of the collected information (Tseng et al. 2008). Eventually, when the research was completed, the taped interviews were deleted; the scripts were made to address the third person singular and not the name of the participants. The reader, in other words, would not be able to know or identify 'who' actually said 'what' and cannot associate answers with a particular person.

This research attempted to better understand complexities in an e-Gov effort taking form in a multi-party government structure with major complications in appointing public servants and multiple contextual factors that can be argued as being very unique worldwide. Therefore, it was very important to be sensitive to the potential arguments or conflicts and avoid disclosure or individual information to the Ministry or Governments' officials or the local public at large. This research took great measures to secure the above mentioned ethical pitfalls.

3.5.0: Potential Limitations of the Mixed Method Design

Every research project design plan has its advantages and some limitations. Throughout this study, the aim was to emphasize the strong points of a method and deal with the weaknesses.

The study attempted to take advantage of the use of case study methodology to get a closer and deeper understanding of the research site at hand. The initial interviews were aimed at providing a first-hand account of key people responsible for the introduction and maintenance of the e-Gov effort. Yet, due to time constraints and funds allocated for the project, not all figures were interviewed, especially the persons that had retired or left the country but were involved in the inception of the ICT effort. Other politicians and think-tankers responsible for the whole Lebanese modernisation process were not available since they had passed away in the explosion that killed the late Prime Minister Hariri and his financial team leader Dr. Flayhan, among others in 2005. This limited the understanding of the donors' intervention and the overall strategic plan that was instigated by Dr. Flayhan.

Document analysis provided rich information about the history of the making of the modernisation process that is almost impossible to obtain by other methods. Through this process the researcher was able to analyse the historic evolution, the goals of the project, the function desired by employees, and the hierarchical structure at the Ministry. On the opposite side however, written standard operating procedures does not necessarily mean direct application by employees, which could be misleading to a researcher who is not familiar with the culture of the people.

This study also attempted to take advantage of the statistical method and its ability in achieving external validity. The need for validity stems from the desire by the researcher to cross validate the contextual factors and the success rate exposed by the first phase, the qualitative phase, and the un-tempered employees' perceived effectiveness. However, the use of the questionnaire solely without interviewing the employees may have limited the analysis of the quantitative part. In other words, the un-conducted

interviews hid the situation and the relationships that could have existed between the dependent and independent variables.

Data and theoretical triangulation used in the first phase was deemed helpful in understanding the trajectory path taken by the e-Gov effort. Yet using both quantitative and qualitative techniques in conducting this research, elongated the data collection time and necessitated the thorough analysis of both types of methods that most researchers shy away from.

Proposition VII was evaluated after the two sets of data thus obtained were analysed and the outcome of this analysis is presented in the conclusion chapter of this study.

3.6.0: Conclusion

This chapter showed the research methodology and techniques used to proceed in this research. To that end, a number of research strategies and techniques were used to help in collecting relevant data that could yield meaningful conclusions and may enable the movement of the frontier of knowledge forward in ICT impact studies. The chapter showed the multi-phase-methodology used in the research and explained the need to have both strategies in the progress of the study.

The following chapter 'Qualitative Data Analysis' develops the case study from a political, cultural, technical and work process point of view to enable a trajectory mapping of the ICT effort in the supposed Ministry. Chapter five discusses the 'Quantitative Data Analysis' that entertained the perceived effectiveness of the Ministry's employees.

CHAPTER FOUR

DATA ANALYSIS I (QUALITATIVE):

TRAJECTORY MAPPING OF THE LEBANESE ELECTRONIC GOVERNMENT EFFORTS IN THE MoF

4.0: Introduction

This chapter presents the background information and analysis about the country, the Ministry of Finance, and the directorate of revenue in particular. Political situations in Lebanon during the period of reconstruction are seen as crucial to understanding the economic activities, since the two are inter-related in a country that is marked by political upheaval. In addition, the chapter also presents the qualitative analysis of primary data collected from unstructured and semi-structured interviews conducted in the Lebanese Ministry of Finance over a period of nine months. The main focus of the data collection was to study the Lebanese Integrated Financial Management Information System (LIFMIS) from inception up until the current situation. In doing so, a conceptual framework similar to Heeks and Stanforth (2007) was followed and the analysis of the data collected was aimed at plotting the trajectory of the e-Gov track on a graph, based on Law and Callon's work (1992), showing the movement of interests among the networks involved whether global or local, the networks and project trajectory, the power struggle within the networks, and the conclusion from these interactions.

Trajectory mapping techniques claimed by Heeks and Stanforth (2007), as an adequate method for a longitudinal analysis of an IT project and could expose the contextual factors involved. The method was also credited to be useful in understand the wrangling, the power struggle among officials in

the organisation, the type of employees and their qualities, the type of management and leadership skills, the hiring process, the IT department's status, and employees' perceived equity. Necessity to expose that stems from the need to have an in-depth investigation of the case at hand to uncover the status of the e-Gov effort from a social and technical point of view. Consequently, this effort will help in addressing proposals I and II listed in section (3.2.1).

The current chapter starts with the country profile (the research site), modernisation overview, and finally the case study and its analysis.

4.1.0: Country Profile: A Background

Lebanon is a country with a diverse population comprised of eighteen different religious sects. The country has around four million inhabitants and a sizable population, of almost five times the in-country population, of expatriates living abroad. The government structure is a parliamentary government style where the three important posts are given to the three largest religious groups; presidency to a Christian, head of the parliament to a Shea Muslim and the prime minister to a Sunni Muslim. Lebanon has experienced several wars in the past; the latest civil war lasted fifteen years (1975-1990). The end of the war witnessed a new constitution agreed on by most Lebanese, known as the Taif accord, the name taken from the city of Taif in Saudi Arabia where the reconciliation efforts occurred, and the reconstruction of the country ensued in the early nineties (FCO 2011).

In late 1992, Prime Minister Rafic Hariri and his team were given a mandate to run the economic and financial policy to move Lebanon from the brink of

a failure state to its old position known as the 'Switzerland' of the Middle East. Hariri was a Lebanese from the South who left to Saudi Arabia (also became a naturalised citizen there) to work and made his wealth by being a very successful business man (International Crisis Group 2010). He was well connected to world leaders and was seen by the population as a saviour. The Prime Minister relied on expatriates and students, whom he funded to study abroad during the war, to create the network that would move Lebanon towards a better future.

The new government embarked on liberalising the economy and building an infrastructure to attract foreign direct investment (FDI). Roads, airports, seaports, bridges, tunnels, and exhibition buildings were erected to lure business men to the country. The private banking sector was seen as a major economic pillar and was given incentives to flourish in order to support the economy (International Crisis Group 2010). The Lebanese pound was pegged to the US dollar and the currency witnessed stability where the central bank was a key player (the largest) in the market to stabilise the currency and no single entity was able to control the devaluation of the Lebanese pound due to this intervention. With currency and political stability, private business started to grow and the country was heading in the right direction (CIA 2011).

Politically speaking, it was not smooth for Hariri all the way. The de-facto military and political power was with the Syrians and the Syrian dominated Lebanese groups who gave Hariri the time and space to boost and move the economy while watching his international connections with concern. Several attempts were made to reduce his clout among the population by introducing several changes to the election procedure (gerrymandering), as

in the election of the year 2000, but in vein. Hariri was wining all elections held with a big margin.

A few important dates are worth mentioning in this study due to their supposed possible impact on the trust in the situation, and hence on the security of the reform program in progress. These dates and the need to clearly identify them is seen relevant due to their expected impact on the economic comparative studies and analysis toward revenues and revenue generation during these turbulent times (UNHCR 2011). They are summarised in table 4.1 and some explanation for the incidents are explained in the next sub-section.

| Year | Incident | Ramifications |
|------|---|---|
| 1992 | <ul style="list-style-type: none"> • Hariri took office | <ul style="list-style-type: none"> • ICT efforts commenced in MoF |
| 1998 | <ul style="list-style-type: none"> • Prime Ministry changed hands | <ul style="list-style-type: none"> • A halt to the ICT efforts • New president sworn in |
| 2000 | <ul style="list-style-type: none"> • Hariri regained office • Israelis withdrew from the occupied south | <ul style="list-style-type: none"> • ICT efforts re-instated • An estimated one million citizens are back under Lebanese governance |
| 2005 | <ul style="list-style-type: none"> • Hariri assassination • Syrian troops withdrawal | <ul style="list-style-type: none"> • A very unstable time for the country • Political instability leading to power struggle |
| 2006 | <ul style="list-style-type: none"> • Israeli 33 days June war | <ul style="list-style-type: none"> • Summer tourism completely halted |

Table 4.1: important dates in Lebanon's political history

The first significant date was in 'November 1998 when Syria orchestrated the election to the presidency of Emile Lahoud, former army chief of staff' (International Crisis Group 2010, p. 4). Hariri ruled himself out of the job after forming three successive governments (1992-1998), and Dr. Salim al-Hoss took the job. In the year 2000, Hariri regained the job and a stormy relationship with the president ensued. The year 2000 also witnessed Israel's withdrawal from occupied land in South Lebanon after 18 years. This in turn, put pressure on the Prime Minister to rid the country of the pro-Syrian powers and their weapons; this shifted the country into pro-Syria and Iran forces versus pro-Hariri and Western forces. In 2003, a pro-Syrian government was formed, headed by Hariri under pressure. The year 2004 witnessed the extension of the president's term by the Syrians against the constitution and Hariri's camp's wishes, which put Hariri at a cross-road and forced him to resign (UNHCR 2011).

On the 14th of February 2005, a massive bomb killed ex-Prime Minister Hariri and several of his associates, the most prominent being Dr. Flayhan, the head of the economic reform program. Major demonstrations (14th of March 2005) followed pointing at the Syrians and their Lebanese allies as the perpetrators (Tueini 2005). The grave incident and the massive show of people in Martyr's Square, estimated at over a million marchers, forced the sacking of the then current government led by Mr. Omar Karami and consequently pressured the Syrians to withdraw their troops after 30 years of presence on Lebanese soil. The government was handed back to the Hariri camp after a landslide win in the election that was hastily conducted by a temporary government led by current Prime Minister Mr. Najeeb Mikati. A major tug of war ensued between the pro-Syrian Iranian camp, now named the 8th of March Movement, and the Hariri Western backed camp,

also named the 14th of March Movement. A detailed account of who took office in the period between 1992-current is shown in table 4.2 below:

| Prime Minister | Finance Minister | Duration | Affiliation |
|----------------|------------------|------------|---------------------------|
| Rafic Hariri | Rafic Hariri | 1992-1998 | 14 th of March |
| Salim El Hoss | George Corom | 1998-2000 | Independent |
| Rafic Hariri | Fuad Siniora | 2000-2004 | 14 th of March |
| Omar Karamah | Elias Saba | 2004-2005 | 8 th of March |
| Najib Mikati | Domianos Kattar | Few months | Independent |
| Fuad Siniora | Jihad Azour | 2005-2008 | 14 th of March |
| Fuad Siniora | Mohammad Chatah | 2008-2009 | 14 th of March |
| Saad Hariri | Raya El Hasan | 2009-2011 | 14 th of March |

Table 4.2: Finance Ministers during 1992-2011

The ramification of the 'war' between the camps or movements reflected considerably on the public administration in the country. This is very obvious to the researcher since late 2005. The '14th camp' are accused of making Lebanon the most indebted country in the world (Luke et al. 2007) and consequently the opposing camp distrusts and rejects their ideas of reform and their connection to the West. On the other hand, the 8th camp is accused of destroying the economy of the country for the sake of forming a canton or mini country within Lebanon relying on Iran and Syria and readying itself for war with Israel with no economic view insight (CIA 2011). This view was assured after the 8th camp was accused of starting the 2006 war with the Israelis where massive loss of life took place, major infrastructure destruction occurred, and the achievements 'built' by the 14th camp economical efforts were reduced (Tueini 2006). The row between the camps about politics, external affairs, internal economic views, strategic

alliances, and the blame game raged in the media and in all walks of life. Since the assassination of the late Hariri, the government has been in a form of caretaker government where no major decisions are allowed. This situation left a dent on the economy, on public management, on replacing retired senior public positions, and on FDI.

Both camps have their loyal employees in different positions within the Lebanese public administration, and both are working on improving their power within the organisation. The modernisation process started by the Hariri camp is viewed by the 8th camp as pro-Western, fearing American and Western involvement in intercepting crucial data and security breaches. The level of distrust was so publicly stated in the different owned media agencies in the country, thus increasing the rift between the two camps. Ciborra (2005) in studying ICT impact in the ME eluded to the fears stated by the 8th camp in his academic article 'Interpreting e-government and development: Efficiency, transparency or governance at a distance?'

Therefore, in view of the above mentioned, the study of the different networks, albeit local or global, and the construction and deconstruction of these networks does take into consideration the leadership and management style in the organisation, the political and power struggle that is so entrenched in the country and in the public administration. This unique and complex wrangling involved made the whole project a challenging effort in gauging the power of ICT inscription in such an environment. It was also a reason for selecting ANT as a suitable theory to use in such an endeavour due to the politics involved and the vast present differences among the civil servants that is rare to find in a supposed cohesive entity or country for that matter.

4.1.1: Background of the Government Modernisation Efforts

By the end of the civil war (1975-1990), the ability of the government to function normally was extremely challenged due to the damage in the country as a whole caused by the war. Infrastructure was in shambles, physical assets destroyed, and a serious depletion in the human resource capabilities (MoF 2004). Many of the talent capital left the country seeking a more peaceful climate, namely to the Gulf area, or the Western world. Fresh, talented recruits were attracted to leave the country due to the local low pay jobs the public sector offers. This in turn transformed the public employment into an unattractive place to work (Rawas 2004).

Practical steps took shape, after a strategic decision taken by the P.M. Rafik Hariri (took office in 1993) to over-haul the public sector. The situation in the MoF was grave due to the war. No paperwork was available since all the records were burnt in the fighting and according to one senior official,

‘Not a single calculator was found in any of the Ministries’ offices, no furniture, and not even doors to lock the offices; the Ministry was in ruins’

He added, when the post-war cabinet were asked to deliver their paperwork for each Ministry’s budget,

‘The size of the documents delivered could fill half a huge room’

This prompted the Prime Minister/ Finance Minister (both posts held by Hariri himself) to ask for automation to reduce the sheer size of the documents and give the government the ability to produce or estimate a budget. This is when the advisor to the Prime Minister for Financial affairs

(Mr. Siniora who became PM after Hariri's death) along with the advisors to the Finance Minister, intervened and embarked on forming a team able to automate procedures. In 1993, the first intervention by the UNDP to aid the Ministry took shape by signing a contract between the MoF and UNDP to conduct a project titled 'Capacity Development for Fiscal Reform and Management' and held an ID number 00013397 with a completion date in 31- Jan- 2011.

During the years 1993 to 1996, one senior member of Hariri's team stated:

'Micky Mouse program were used to establish databases and workflow automation....all locally made, but they worked at that time'

This was re-iterated by the head of the UNDP team who rejuvenated the effort in later stages. In 1994, the Office of the Minister of State for Administration Reform (OMSAR) was established in order to be the global reform body in the whole administration in the country. OMSAR joined efforts with UNDP for that matter in a project numbered 00013388, titled Civil Service Reform and was responsible for reforming the badly shaped civil service in the country.

The government realizes the challenges it faces in modernizing its current management, basically introducing IT to all levels of the job, and the extensive training for all employees involved in the modernization process. New blood would have to be introduced to the public sector. Male and female agents aging 20 to 30 were recruited by the Civil Service Board (CSB) after passing legitimate exams. The gap in the human capital was getting filled. Training was set up and intensive training followed. Advice was taken from several experts on how to get the best out of the new employees, how to give training to the older employees to keep them productive and not to

let them feel left out in the modernization process. The vocational training and improvement centre, that got established, was training all the new recruits, and giving training for senior employees. Many government agencies, offices, and special units were used to help the Assistance to the Rehabilitation of the Lebanese Administration (ARLA). The most significant are the Civil Service Board, (CSB) or also called (CSC), Civil Service Council, and the Institute of Public Administration (IPA).

OMSAR was responsible for handling the modern training in the early days with the help of the NGO's and world bodies, while the CSB and IPA were getting prepared to assume that role (train the trainer) which is traditionally their role after the commencement of their staff training. OMSAR's role grew and it was to handle the whole modernisation efforts in all Ministries, all administrations, and lead the way in e-Gov efforts. However, as mentioned by an advisor to the Minister:

'OMSAR did not have the staff needed to be on the ground in each Ministry and funds or the political will was just not there....We at the MoF started our automation work before OMSAR existed and we decided a long time ago to go solo and not wait for the bureaucratic red tape, hence the electronic Ministry of Finance (e-MoF) was established.

In reality, OMSAR was established in 1994, well after the ICT unit started working in the MoF which made the ICT unit outpace the progress of OMSAR. Hence, the inclined authority given to OMSAR to advance the administration was always preceded by the work conducted at the MoF, and consequently its effort to take a leading role in the MoF did not materialise. By the same token, MoF leadership lacked OMSAR's shared vision and realised that OMSAR will need time, new laws enacted, and resources to

make it productive; time that they couldn't afford in the MoF. They decided, then, to go solo.

In November of 1996, the government asked for foreign intervention and a mission led by Mr. Ourvouai and Mr. Reynaud (French experts) started to analyse the needs assessment of the MoF. Their findings are summarized in the following: (Ourvouai and Reynaud 1996, P. 6-7)

- 'Insufficient knowledge by the Directorate general of Finance personnel at every level of the hierarchy: staff size, distribution, recruiting (failure to recognise prospects), even salaries (breakdown of the assigned budget).
- Sociological matter: working together in the central office is (are) highly experienced male agents in their fifties, far younger female agents (aged 25-30), less experienced but better educated and dynamic. Very few male agents.
- Many ranking officials complained about lack of personnel due to unappealing salaries.
- Qualified positions are often held by agents lacking the required skills, either because of inadequate training or because they formerly held employment that had nothing to do with finance'.

From the various interviews they conducted, two major projects were deemed needed: computerisation of the departments, and establishment of the Institute of Finance where training and re-training could be of vital importance. Their report supported the view by the government for the drive towards automation.

4.1.2.0: Overview and History of Case-Study

The MoF is made up of three separate divisions, namely: General Finance, Customs, and Cadastre. The case under study focuses in particular on one directorate (there are eight directorates in the MoF; please refer to the

organisational chart of the MoF in appendix C) namely, the Directorate of Revenues (RDMoF), in the Lebanese MoF. The main ICT effort in this directorate has been the development of an Integrated Financial Management Information System (LIFMIS) and has been ongoing since 1993. This span of seventeen years (1993-2010) witnessed the forming of (LIFMIS) with many components in the directorate, with several stakeholders involved in the project (refer to table 4.3).

| Stakeholders | Organisation | Department | Designer | User | Interests |
|----------------------------|----------------------------|-----------------------|----------------------|--------------|------------------------------------|
| Government of Lebanon | MoF | Revenue | + | + | Automation |
| | | Budget | + | + | |
| | Finance Minister | Automation | + | + | Leadership |
| | OMSAR | e-Gov depart. | | + | e-Governance |
| | Local Provinces | All Departments | | (from 2006) | Automation |
| International Institutions | CIDA | Democratic Governance | +(from 95-05/ 02-06) | +(until 06) | Tax Reform & Democratic Governance |
| | EU | Euro-Med | +(98-00) | | Friendship |
| | UNDP | Beirut Office | +(93-11) | + | Strategic Partnership |
| Other Government Arms | Lebanese Transparency Ass. | Head Office | | +(from 2007) | Monitor Transparency |
| Suppliers | SOGEMA | Canadian Office | + | | Profit |
| | IT unit | MoF Offices | + | From 93 | Produce Tailored Software |

| | | | | | |
|--------|------------------------|--|--|---|--|
| Public | MoF Training Institute | | | + | |
| | Businesses | | | + | |
| | Citizens | | | + | |
| | Media Outlets | | | + | |
| | | | | | |

Table 4.3: Classification of key stakeholders by function

In table 4.3, the first and second columns list the stakeholders involved in the project. The government, being the initiator and main beneficiary of the project, was listed, and in the second row of the second column the particular stakeholders within the government were listed. The international institutions that helped Lebanon, and were part of the global network, were listed in column two in the second row. Other organisations with stake in the project were also listed in column two; those of the Lebanese Transparency Association to monitor transparency, SOGEMA and the IT unit in the Ministry were listed as the providers and developers of the tax software. Other listed stakeholders were the training institute in the Ministry and businesses affected by the digitising progress of the Ministry. Column three showed the specific department as the stakeholder in the project. Designers or users of the project were indicated in columns four and five with a plus sign with dates (in row two) showing when the design process took place. The sixth column showed the different interests of each stakeholder in the project.

Below is the story-line for the longitudinal study showing four distinct phases of the project's evolution.

4.1.2.1: Phase I: Automation as a Necessity (1993-1995)

At the end of the civil war a new government was formed with an aim to alleviate the troubled financial situation and move towards a modern government. The MoF was the focus to act as an example of modern government style that all other Ministries should follow in the new Lebanon. The Prime Minister himself took over the job of the Finance Minister as well and surrounded himself with very reputable expatriate advisors. UNDP were asked to help in the capacity building and in screening future IT personnel to work in the MoF. The Prime Minister provided the working space, since the MoF building was destroyed, and used his own funds (from 1993-1996) to pay the salaries of the MoF IT team to jump-start the automation efforts in a Ministry that was seen as the most influential. One of the pioneers of the ICT project stated:

‘We started to work from the Prime Ministers’ office building after he offered the temporary space, while the Ministry of Finance was being re-constructed. Our salaries were also paid from his pocket and not from the government’.

An IT team, made up of a handful of people, with a main aim of forming a taxpayer database, was established and the Finance Minister appointed a full time project director for e-Gov in the MoF, named later e-MoF. The reform programs at the Ministry fall under four categories as shown in figure 4.1 below:

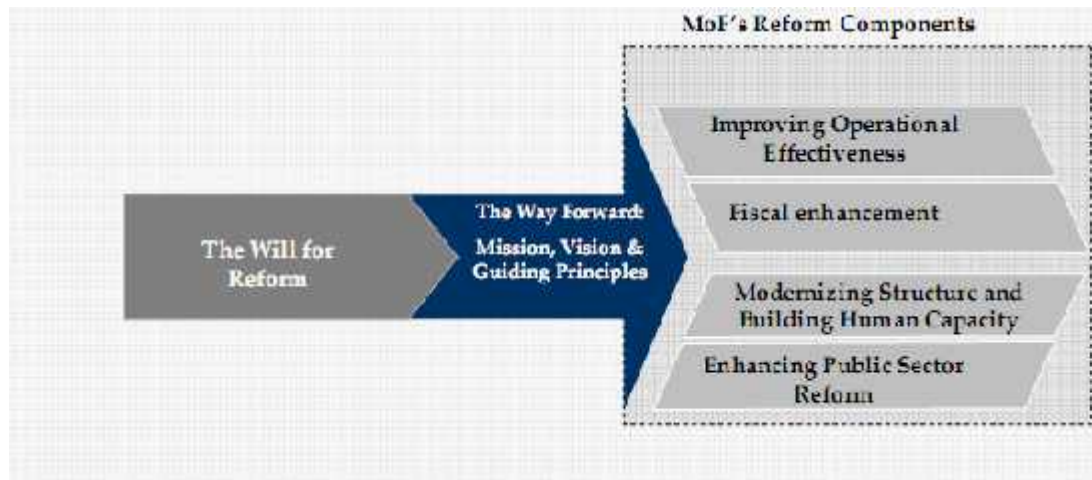


Figure 4.1: MoF reform components, taken from Reform MoF 2005-2007 Presentation P 12

The stated mission and vision by the MoF (MoF 2005-2007, P 13):

'Vision: The Ministry of Finance shall lead the government's economic reform through sound formulation and management of fiscal policy and public debt in order to foster sustainable economic growth in alignment with national priorities, acting as a role model for transparency, and accountability, in a manner that reflects good governance.

Mission: The Ministry of Finance shall continue to achieve its vision by pursuing process efficiency in the delivery of its services, using latest proven technologies and best managerial practices at lowest costs, in an effort to consolidate the trust and confidence of the public, and ensure cohesion between fiscal and social policies'.

On the technical communication front and parallel to the office work, ICT infrastructure for data transmission was getting built. Local Area Networks (LAN) were up and running in each of the MoF offices, Metropolitan Area Network (MAN) was also formed in each city connecting all local offices, and a Wide Area Network (WAN) connecting all MAN was completed by 2004 (MoF 2004). Electricity problems, which are severe in the country, were

dealt with by the installation of Uninterrupted Power Supply (UPS) in all the offices and for all the servers on the networks (ibid).

The automation efforts at the Ministry however, did not move flawlessly, as one senior advisor acknowledged:

‘Several stumbling blocks appeared however; resistance to IT by the existing employees, lack of ICT equipment, no knowledge workers to operate the IT systems, the need to have personnel on the ground to assess the taxpayers physical existence after the war, and no official posts and job descriptions of IT positions since they never existed before, hence the need to change the laws to allow for the creation of such posts’.

The Canadians and Chinese donated personal computers to the government as an aid package to help in the reform process. People from Lebanon statistics offices were asked to survey, physically, taxpayers and households in the whole country. Permission to hire professional IT staff outside the MoF cadre was given by the Finance Minister with spiffs and allowances allocated to these ICT posts to lure people to apply. This process was deemed needed by the Hariri government, a senior official at the MoF said:

‘This was to hasten the employment of such talents and not wait for the laws to be enacted which we (the Hariri team) believe take too long to conduct in the Lebanese legal system’,

and in order to reduce the ‘computer phobia’ held by the civil servants,

‘I ordered the installation of pc’s in all the new offices built for the MoF with games installed, and asked the employees to play games in their spare time, which was a lot back then’,

He added that the above-mentioned order saw its fruits in as little as a month's time, when almost all employees were using the computers for playing Solitaire; when the time came to conduct data entry,

'Computer phobia was just not there anymore and almost all employees were able to conduct data entry with ease'

In addition, and to reduce the shortage of knowledge workers working as tax-administrators, several employees from the IT office at the MoF assumed the role of tax administrators until the staff levels were built up. This was the account of a senior manager in the IT department:

'We had to send our people to work as tax administrators because they (TA) were lacking in staff and our people were not able to obtain the business requirements to automate them, so we opted to send them there; that way we hit two birds by one stone, helped in tax administration for that time and enabled our developers to access first-hand the business needs of the future knowledge workers in the Ministry'.

That in turn, gave the IT developers a feel of what the needs were and the business requirements in the tax administration offices. Hence, a local organic tax system and a database system, based on DOS, were produced by the few developers at the IT centre and information obtained from Lebanon statistics was being entered in the database on a regular basis by the older, previously IT-phobic employees. The workload grew frantically and the need to introduce more human capital to the organisation was a necessity. The Civil Service Board (CSB) prepared special exams for posts in the tax administration cadre.

4.1.2.2: Phase II: capacity building and SIGTAS (1995-1998)

With the sheer amount of paper work, employees for tax administration duties were hired for the Ministry through a rigorous testing procedure that claimed to be fair and non-bias. The newly hired civil servants in the Ministry needed training to conduct their work according to the new procedures. Consequently, that forced the creation of the Finance Institute (1996), which is part of the Ministry with a main aim of training new comers on how to deal with taxpayers' issues (customer service), how to use computers to make quicker transactions (workflow), and how to produce reports from the automated systems. Almost all employees had to go through the training institute before joining the regular workforce.

With the taxpayers' database sizing up, attention by the IT office at the MoF shifted to finding tax software to capture and estimate future tax revenues. An off the shelf program was used (Tax-Solve) to handle taxes but the software was not in sync with the Lebanese tax procedures. An IT manager re-iterated:

'Despite the fact that Tax-Solve was a good software at the time accounting for taxpayers' profiles and every information related to them, extra time and staff were needed to capture and input information to the system. Moreover, the Tax-Solve program did not conform to the Lebanese accounting standards'.

Advisors to the Finance Minister and from the UNDP suggested the need to have a solid based tax system for the country. By late 1995, efforts by the MoF, the Prime Minister's office, UNDP, and the EU, secured a project by the Canadian International Development Agency (CIDA) to help in the Lebanese

taxation reform (support for taxation reform phase I- numbered A018869-001) by offering the software SIGTAS by CRC SOGEMA Inc. (Canadian based company) based on Oracle technology. CIDA consequently repatriated Lebanese expatriates, who worked in Canadian tax offices during the Lebanese civil war, back to Lebanon with full salaries all paid by CIDA for two years (1996-1998). A senior expatriate explained why she is back in Lebanon from Canada:

‘I was working in revenue Canada in automation and regular tax work and was there because the family immigrated during the war in Lebanon, and then the Canadian authorities gave my colleagues and I an option to keep our salaries and our affiliation, but work from Lebanon to rebuild Lebanon...I could not turn that offer down and here I am’.

This international effort enabled the creation of a team known later on as ‘the UNDP office’, as described by the head of the UNDP office,

‘A team that provides the country of Lebanon with professional technical assistance capabilities and macro-economic advisory role’

SIGTAS, however, did not match the Lebanese tax regime either, which is far from the international standards in terms of accounting, it was not in the local language, and required some major customisation by the IT centre to match the Lebanese tax procedures. By early 1997, the new ‘Lebanese’ SIGTAS version was completely overhauled and rolled out for implementation by the tax administration. The software was to be used simultaneously in seven regional departments in the five provinces of the country. It is worth mentioning that two accounts of ownership were detected for the Arabic SIGTAS version, one by the UNDP office as one senior officer stated:

'We overhauled the system from A to Z and we almost made new software from scratch'

and one by the IT unit at the Ministry:

'Our team did not use SIGTAS at all, but rather we created our software with similar features to SIGTAS; we are only calling it SIGTAS to let the Canadians feel that they have helped the tax administration and their future help stay always welcomed'.

The reality of the claims lies somewhere in the middle, where the researcher observed during his many visits and stays at the Ministry and at the UNDP offices, an IT developing office at the UNDP centre where employees were acting more like technical assistants to the local developers and programmers in the MoF IT unit. Hence, it could be said that the new version of SIGTAS was indeed a joint effort by both teams.

4.1.2.3: Phase III: modernisation paused (1998-2000)

In 1998 a new president was sworn in and the Prime Ministry changed hands. A new Finance Minister took over with a strategy of reducing debt in the country and increasing transparency in the government and in particular in the MoF. High post positions were filled by personnel that favour the new Finance Minister's view and strategy and that re-instated the assumed power by the Ministry's old guards, sidelined in the change/automation strategy. 'Highly paid' contractual employees were included in the austerity measures by the new government; it simply meant all the workers at the IT office. Spiffs and allowances, not mentioned by the Lebanese law but rather given due to a Ministerial decree, were targeted. In the first of January 1999, a decree numbered 719 removed all benefits from the contractual workers and

consequently the IT office at the MoF was extremely affected. A senior IT official at the Ministry commented:

'I lost 50 to 70% of my salary when that decree was out'.

The ramification of the austerity measures was grave on the other personnel of the IT office, and the number dwindled from thirty IT professionals to eleven. This was the account of the head of the IT unit when he stated:

'Two or three developers remained in the centre while all others left to a better paid organisation. Some teams were made up of one person and we were running a skeleton office despite the enormous workload that was put on the unit'

Hiring to the IT office was blocked pending a legally IT-cadre situation adjustment. With this lack of IT technical professionals and program developers, the automation process in the Ministry and the full implementation of SIGTAS came to a halt. The head of IT resigned and was replaced by his deputy who reluctantly accepted the reduction in salary and the IT office barely existed.

At the UNDP offices the situation was not that clear either. CIDA salary contribution for employees ended in 1998 and the old team (Hariri outgoing administration) scrambled and succeeded in securing salaries to UNDP employees from the EU (another donation secured to help the tax reform process under the Europe Mediterranean Neighbourhood Agreement). That kept the working and the macro-planning on-going in the UNDP offices during the period of 1998-2000 and since they were not directly paid by the government, they were not affected by the new austerity measures.

The Hariri re-engineering team ex-members in the government, though outside their offices, were kept as a shadow team planning and preparing for the next stage of e-Gov work pending the 2000 election, of which they planned and expected a clean sweep. On a positive note however, and arguably due to the realised necessity of having automation by the new government, the newly appointed Finance Minister succeeded, by the end of 2000, in drafting a cadre for the IT office where the number of employees allocated went up to 35 and a new IT hiring procedure was designed with salaries adjusted matching the market range so as to attract newcomers. This was marked by the new IT manager:

‘By the end of his term (the Finance Minister), our salaries went back up to where they were, almost, but this time it was done in an appropriately (legally) designed procedure’.

That paved the way for a new recruitment effort to staff the IT unit properly.

4.1.2.4: Phase IV: the rebirth of revenue automation (2000-2010)

After two years of halting the automation efforts and the return to manual work, a new government was formed with Hariri again as the Prime Minister with his ex-consultant for financial affairs as the Finance Minister. The ex-IT head was appointed as the advisor to the Prime Minister in e-Gov efforts; automation plans, prepared during the lull, were rolled out. Employees in the IT office were back up to 30 and the different software produced locally for the Ministry were implemented. Table 4.4 lists the software developed by the IT office for the Ministry and indicates which department used the software in its daily activities:

| In-House Software | Used by what MoF Department? |
|--|------------------------------|
| <ul style="list-style-type: none"> • PIT • CIT • Cadastre • Will distribution (inheritance) • Web-portal • E-taxation • Archiving | Revenue |
| <ul style="list-style-type: none"> • Payroll • Leave of absence • Retirement • Time machines | HR |
| <ul style="list-style-type: none"> • Cashier • Accounting • Stamps • Liabilities • Advances | Treasury |
| <ul style="list-style-type: none"> • Budget system | Budget |

Table 4.4: List of Software Used in the MoF

The software produced claimed to be tailor-made for the Ministry and the features were satisfactory for the business knowledge workers since they fulfilled all their business requirements. The head of IT brings this familiarity of the business requirements back to the time when the IT workers and developers were themselves working as tax administrators. The only software that was outsourced was SIGTAS, yet the IT office still claimed its ownership since the language change and customisation occurred in the office itself and by the developers. This gave SIGTAS a Lebanese identity and hence was considered as local software. This can be ascertained by the head of the IT office when he stated:

‘This software identity local adoption gave the IT office in the Ministry a sense of pride in what they produced and pushed them to excel more to fulfil all the Ministry’s needs’

After SIGTAS was deployed for tax collection and reports were being generated on a regular basis, and in order to increase revenues to the

government, the Ministry turned its attention to a new tax that would bring more income to the government that is Value Added Tax (VAT). CIDA assembled another project numbered A018869-002 titled 'support for taxation reform phase II' in 2002, using SIGTAS for VAT collection. SIGTAS-VAT was also customised by the IT office and has been in full swing since then (2002). Again CIDA provided the funds for the software and with young employees at the tax administration, already IT savvy, the implementation went smoothly, claimed a VAT official:

'We run an even more sophisticated operation than any office in the MoF, we got the most advanced equipment, and the nature of our operations concerning nabbing VAT evaders or business non-registers, requires more IT savvy personnel which we have'.

With the steady and unwavering commitment from the government to completely automate the MoF, funds were allocated for the ICT efforts and attention by the IT centre shifted towards integrating the different software applications via a fibre optic network (the newly (1994) telephony installed system was based on copper wire technology which limits data communication speed). By the end of 2008, the LIFMIS was a reality with all offices securely connected with fibre optics lines and e-tax portal was running in its trial phase. However, instability in the government and the inability of the parliament to make a decision regarding e-filing legislation was a major hindrance for the e-tax efforts. By the end of 2010, e-filing was still far from implementation, pending legislative work concerning digital signature and the availability of a secure gateway for e-money transfer and password authentication and security.

4.2.0: Case Analysis (local and global networks)

The chronological events mentioned above during the 17 year period summarised the e-MoF in Lebanon. There exists a trajectory of sorts; starting with an organic system that was imperative commenced by the very basic elements, namely an IT unit leader, few developers, off the shelf software, and data entry personnel. The project was initiated and evolved to its final stage with a trajectory that according the Law and Callon can be best described by ANT framework of local/global networks. Figure 4.2 presents the stages during the life of the project and below is the explanation of how each stage is represented in the figure.

The project started by the formation of a small, yet determined global network (point A) made of the MoF leadership which was in the hands of the decision maker, the Prime Minister. Since he held both posts, coupled with the UNDP (1993) quick intervention to modernise the work at the Ministry took place. The mission in this stage was basically to assess the financial situation in the country and build a database to at least have some basic statistical information on what is available for taxation and other financial matters. The UNDP was concerned with the capacity building for the fiscal reform and management at the Ministry. The local network, made up of a small IT unit and some of the 'interested' MoF administration personnel, simultaneously got mobilised by the formation of the global network, but this formation was weak due to the lack of physical (buildings and offices) and ICT infrastructure (no phones or any other communication), lack of revenue administration personnel, rejection of change by the older employees, and an archaic method of hiring new workers.

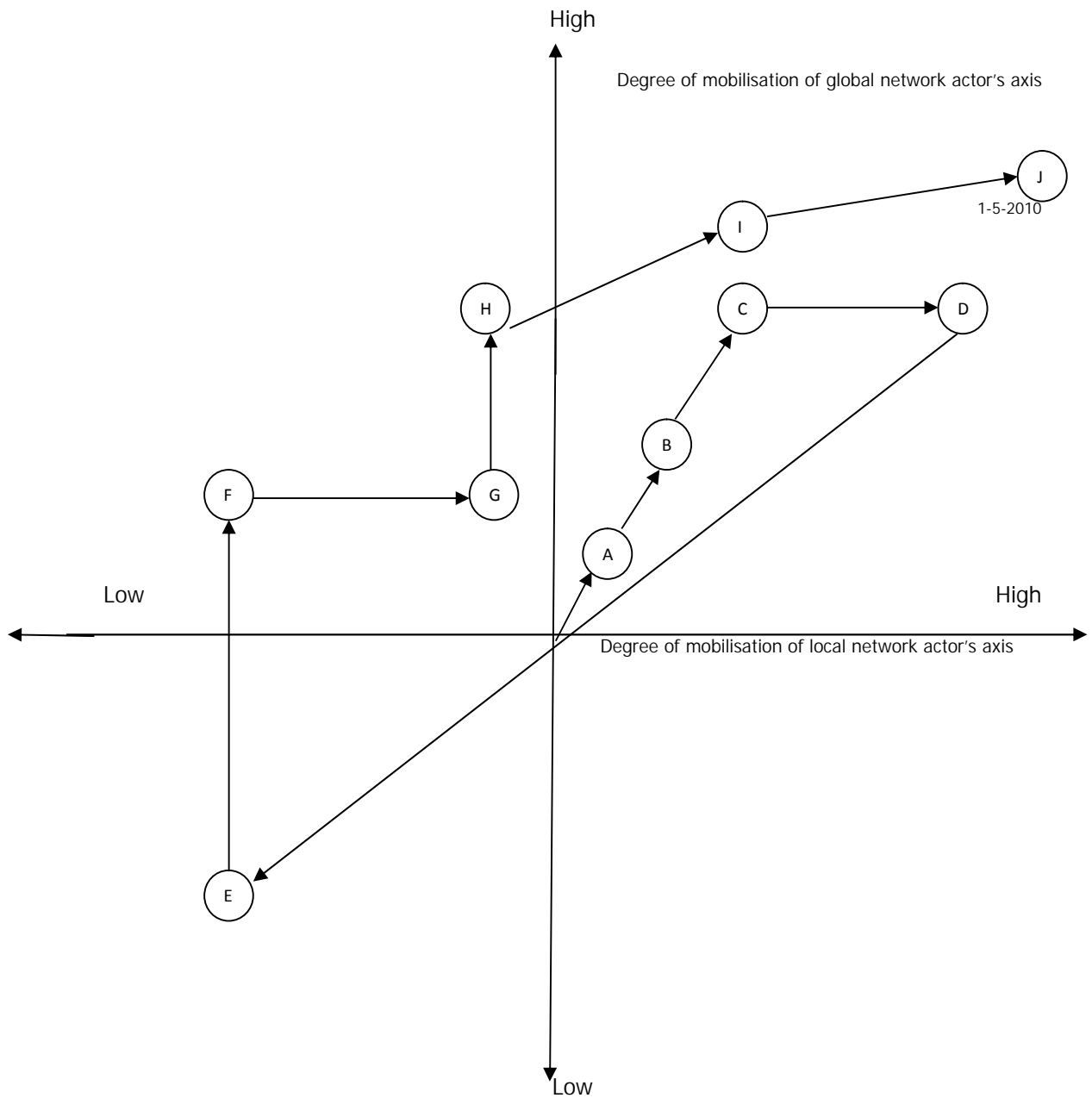


Fig 4.2: LIFMIS Network Analysis based on Law and Callon, 1992

After a year had passed, the global network was sized up by the creation of OMSAR. Programs involving training of the trainers and of employees, who were hired by the help of the UNDP, ensued at a fast pace. This in turn, gave the local network the push it needed to acquire staff in the tax administration and the IT unit. The global network was also strengthened by expatriate technical and macroeconomics advisors that pushed the production of both networks forward (point B). A further boost to the global network was by the intervention of CIDA in 1995 in their Support to Taxation Reform project phase I. The Canadians brought tax software (SIGTAS), personnel to operate the software, and the wages that come along with that effort. Eventually those personnel became the advisors, albeit in IT technicalities and tax administration throughout the process. The Canadian effort on the global network side was mirrored by hiring experts and developers in the IT unit, allowed by the Ministerial decision, to boost the performance and mobilisation of the local network (point C).

The establishment of the MoF Training Institute (1996) improved capacity building and strengthened the local network by producing freshly trained tax administrators who are now computer savvy (point D). Quitting the Prime Minister job (1998) meant also the loss of the legacy of the Finance Minister and both posts were given to two different individuals who had a policy of austerity in the government rather than enlarging government. CIDA's employee salary contribution ended in 1998 putting more pressure on the global network. In addition, the change of strategy in the macroeconomic vision delivered a blow to the global network and that in turn reflected on the local network. Reduction in personnel was seen in both networks and the deconstruction of the networks was in progress. The refusal to accept the IT unit and the software produced as an obligatory point of passage for conducting work meant the disintegration of the both networks (point E).

In spite of the loss of funds by CIDA for one of the networks in the global network coupled by the loss of Ministerial leadership, the global network stayed barely afloat by the contribution of the EU to pay the MoF advisors' salaries. In the local network however, the loss of parts (spiffs and allowance) of the salaries in the IT unit drove more than 50% of the team to leave. In addition, 'mistrust' in digital information security rendered all automation in the Ministry as suspicious, hence procedures were back to manual, and a major network element (IT unit), out of the heterogeneous local network, lost its zest to survive (point F). After two years of ruling (end of 99), the new government (back then) felt that the need for automation is insatiable in the MoF, the IT unit was given a cadre of 35 employees with salaries matching the area. This change of heart boosted hiring into the IT unit and the local network was starting to re-mobilise (point G).

In year 2000, the Hariri team was swept back into office with a clear mandate to handle the economic situation that saw a setback during the past two years. The government re-assembled the economic and financial advisors at the Ministry, gave the IT unit's chief a free hand to hire experts and developers, and assumed the financier role of the UNDP office, thus mobilising the global network enormously (point H). Given a clear mandate, the global network comprised now of two networks, MoF Minister and advisors and the UNDP office, embarked on plans to add more features to the LIFMIS by adding a VAT element. CIDA was added to the global network by their second project in the Ministry to establish a VAT module within SIGTAS. The new module was added in 2002 and it was integrated directly in the LIFMIS. A huge VAT building was filled with newly trained VAT employees and revenues were generated by the end of 2002 according to plans (point I). The project received an over-haul and additional features by

the IT unit during the span of six years (2002-2008) where modules' programming language changed from the old VB.6 and SQL to VB.Net and Visual Studio 2008; the e-taxation module was rolled out for testing, and modules' integration was completed throughout the whole LIFMIS. At the same time, all the offices in the country were securely connected with a virtual private network (VPN) using fibre optic connecting medium that boosted connection speeds (point J). The episodes and their consequences shown in fig 4.2 are further summarised in table 4.5 below (G=Global network & L=Local network):

| Node | Description | Consequences |
|------|--|--|
| A | <ul style="list-style-type: none"> 1993 the start of a small automation effort in the Ministry of Finance No physical or IT infrastructure | <ul style="list-style-type: none"> G&L goes up slightly |
| B | <ul style="list-style-type: none"> 1993 (end) UNDP assistance in capacity development for fiscal management and reform project | <ul style="list-style-type: none"> G increases |
| C | <ul style="list-style-type: none"> 1995, CIDA stepped in offering SIGTAS and employees' salaries A ministerial decree allowed an IT unit structure | <ul style="list-style-type: none"> An increase in the mobilisation of G and L |
| D | <ul style="list-style-type: none"> 1996, the establishment of the MoF training institute | <ul style="list-style-type: none"> Increase of L |
| E | <ul style="list-style-type: none"> The change team taken out of office | <ul style="list-style-type: none"> Drop in G&L |
| F | <ul style="list-style-type: none"> In 1998, EU steps in to keep UNDP office afloat by paying their salaries | <ul style="list-style-type: none"> Slight increase in G |
| G | <ul style="list-style-type: none"> 2000, IT units' salary scale authenticated | <ul style="list-style-type: none"> Slight increase in L |
| H | <ul style="list-style-type: none"> 2000 Change team is back with a clear mandate | <ul style="list-style-type: none"> Sharp increase in G |
| I | <ul style="list-style-type: none"> 2002 introduction of VAT software by CIDA | <ul style="list-style-type: none"> Increase in G&L |
| J | <ul style="list-style-type: none"> 2008 major improvement in integration and e-filing | <ul style="list-style-type: none"> Increase in L and slight increase in G |

Table 4.5: Episodes and Consequences

4.2.1: Networks affecting project's trajectory

Looking at the chart resembling the LIFMIS evolution in figure 4.2, a graphical representation summarises the life cycle taken involving the local and global degree of mobilisation and their inter-relationship. Initially, the project was in its infancy and only little mobility was evolving in both networks due to the fact that both networks were building their entities. Each of the networks resembles heterogeneous networks and forming these networks takes a time span to translate all the interests of the groups into one. The global network was comprised of, at a very early stage, the Minister, his advisors, and a handful of IT people. Funding was provided by the Prime Minister, but no legal clout was available for forming such team to pay them from the government itself. As mentioned before, the law only provided positions for 'card puncher' and the like which were posts held as IT personnel in the old days. The ability to draft Ministerial permission in 1996 to hire IT workers, though contractual, formed the very basic element in forming a local network (to handle the IT effort) paid by the government and not the private money of the Prime Minister. It is worth mentioning though, that the formation of such a small team by the Prime Minister with his blessings and funding gave the team the space for action, the political clout to function, privacy for the members to brain storm and decide, and autonomy. On the negative side nevertheless, the legitimacy of the members' status was always in doubt, due to their contractual status and not in a government allocated cadre, which dampened the job-security of the workers in this effort and made their mere existence directly related to the Prime Minister himself. In terms of network formation, this legitimacy issue, when challenged, may disintegrate the global network and part of the local network (the IT unit) very fast.

The local network was not only made up of IT people, tax administrators were also included in this heterogeneous network. Older tax administrators, who held senior posts, were not very keen to use computers in their daily work activities but their numbers were not adequate to run the now-abundant tax administration or the MoF's work. Their ability to slow the automation process was enticed by their fear of losing power in the organisation, yet proper implementation of the change management technique avoided a major slowdown. Resistance to change was handled by introducing computers for gaming, by training older employees on how to benefit from computers and learn how to conduct data entry, and by hiring younger IT educated employees in great numbers that rendered the rejection to change as weak. These actions taken, allowed a solid local network to integrate with automation as a focal point in their belief.

This local network however, found limitation in their abilities. A holistic e-strategy matching current best practices to automate the workflow was not there. The tax administrators did have the numbers or the knowledge on how to reform the tax regime to match the developed world. Both elements in the local network felt the need for a global body that can leverage the work. The enlargement of the global network provided by the UNDP introduction, allowed for funds and contracting of the suitable IT employees. Conforming to Law and Callon (1992), and in explaining the mobilisation of global and local networks, it became obvious to the researcher that, by enlarging and mobilising the global network, a swift mobilisation of the local network followed as well.

When the global slowed down its mobilisation, the modernisation process did too. CIDA's work and OMSAR's formation further mobilised the global

network where OMSAR helped in training the newcomers and CIDA donated the software and the experts in tax administration. OMSAR tried to install itself as an obligatory point of passage (refer to OPP in chapter two in the explanation of ANT moment of translation construct) to several stakeholders not only in the MoF but rather for the whole government as shown below in fig 4.3:

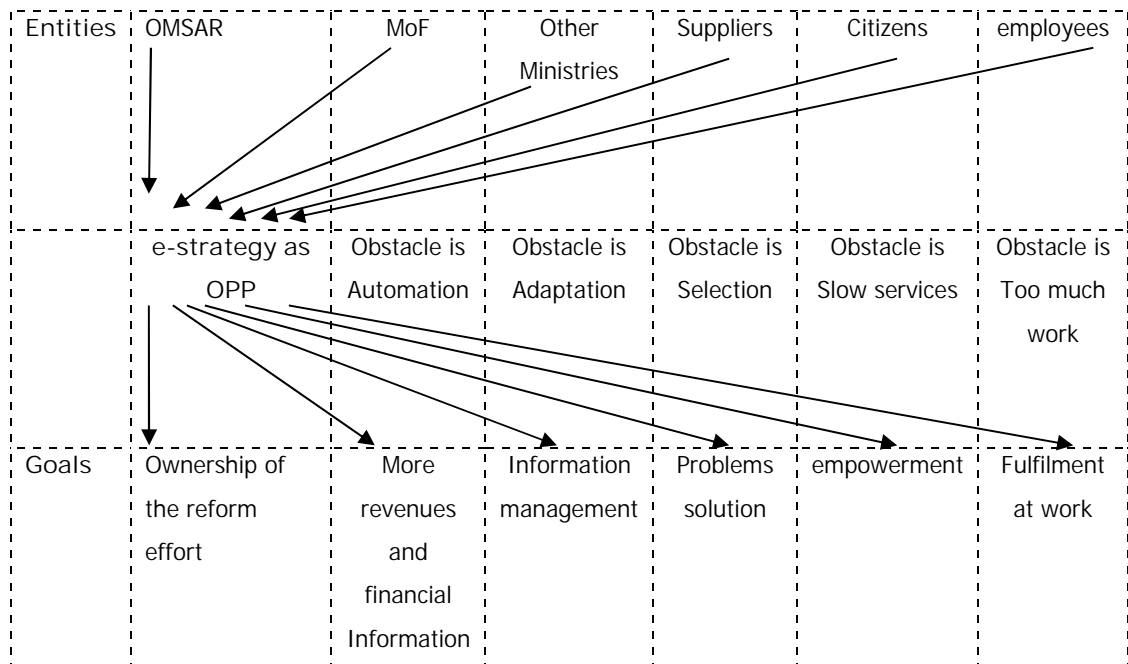


Fig 4.3: Translation in Action (adapted from Callon 1986)

However, the translation of actors in the global network was not in favour of having OMSAR take this role. Resistance to OMSAR's natural role strengthened when the MoF claimed ownership of the reform and automation program in the Ministry, since they started automating their process before the creation of OMSAR itself, and were not willing to give this ownership to other entities. This was clear as one advisor to the Prime Minister in the financial affairs iterated:

'OMSAR's natural role was to automate and rehabilitate all government entities, but OMSAR does not have the resources, the manpower, the money, the knowledge of what details are happening

in the MoF, therefore, giving this role to OMSAR will not improve things but rather the opposite. We decided not to allow OMSAR or any other governmental entity for that matter to interfere with our work towards automation in the Finance Ministry. This is why we call the project e-MoF and it is outside the scope of the e-strategy put by OMSAR'.

The MoF officials wanted the software produced by the IT unit with the help of foreign bodies to be the OPP for all stakeholders involved. The obstacles, in turn, were in the ability to assemble and translate the interests of actors in the local heterogeneous network and solidify the mobilisation of the local network. Both networks were hiring and training workers to fill vacancies in their allocated employee cadre in order to fulfil the tasks given to them. Within the tax administrators' actors, several networks were organically formed such as a network of tax administrators in each regional office in the five provinces, and a strongly bonded network made up of older, but vocal, tax administrators' senior officers and the employees whose financial aspiration and strategy is different from those in the change team. They saw all work done by the change team, headed by the IT unit, as suspicious and unnecessary. They also considered salaries given to the IT unit members as ridiculous and exaggerated according to Lebanese standards. The group felt that the IT unit takes its authority from the Minister and his advisors directly and bypassing the chain of command in the MoF.

This is considered as 'seepage' between the local and global network, according to ANT literature which undermines the solid formation of the networks involved; this seepage allowed for the disenchantment by the superiors of the tax administration directorates of whom the IT unit personnel must report to. An important element in this was evident to the

researcher from the statements given by some senior officials in regards to the IT unit:

'It is true I am his (an IT unit member) superior, but if I don't agree on something, he can write directly to the advisor to the Minister and can make things go through without even my blessings'.

'I don't even know what they do in that unit'.

'Go interview them, let them exaggerate their work that is full of bologna'.

'We still run all back-office work manually since we don't trust their IT technical skills or even the people running the unit themselves, honestly we don't even know where the Financial information is ending up at'.

'Their systems crash and maintenance for the software is nil'.

'Lots of talk up there but no substance'. (IT unit offices are located upstairs in the same MoF building)

'Go get some major show-off presentation from them'.

'Can you imagine some IT unit's official make twice in salary as the highest paid individual in the Ministry? It is ridiculous'.

By the same token, members in the IT unit in the MoF reciprocated the scene:

'I am sorry you are witnessing such management incidents'.

(The official was referring to the researcher's inability to interview employees except after a long wait and a lengthy paper work procedure that went wrong several times due to the English written request rather than a request in the local language-that caused a delay of 3 weeks in getting permission to interview personnel at the IT unit)

'It is sad but true to have such characters in the MoF (referring to the older generation in the TA offices), but this is what we face daily'.

'I am trying to be professional but they don't seem to understand what we do, or even want to understand'.

'Am not sure what will happen to us (in the IT unit) when there is a political shift in the country'.

This 'we' (tax administration, since the seniors claim to represent all the workers in the Ministry) and 'them' (the IT unit, UNDP office, and the Finance Minister and his advisors) is a phrase that can be still heard regularly in the Ministry among the management echelon even in 2010 during the data collection period by the researcher. This indicated that the heterogeneous actors involved in the local network, despite its proper formation, were having problems in mobilising the network. Some influential elements within this local network may reject the modernisation efforts and cause problems, or may elect to mute their objection for a period of time depending on either political or job security reasons.

However, from 94 to 98, the muted rejection by some elements from the middle management in the MoF was vivid and the global and local networks were strongly mobilised during phases I and II. The sheer number of employees hired and the reshuffling of posts in the managerial positions, reduced the physical contact and close communications between the rejectionist network and employees. In other words, the few older employees were given posts that are not in direct relations or contact with the newly hired employees. Furthermore, communication between top management and line managers and employees at various directorates was being conducted via electronic media, thus, bypassing middle management. This type of communication channel, indirectly intentionally or not, weakened the rejectionist network from expanding within the MoF. In addition, the bombardment of MoF employees with e-mails and publications concerning the progress of MoF automation and modernisation helped those

employees feel proud of their own production and benefits to the country. That sense of pride strengthened the local network.

At the end of 98 (phase III), the fallout of the government came about and another government took office with totally different views about the economic file in the country. The global network collapsed quickly (CIDA stopped UNDP's office salaries) and the Ministerial permission to pay spiffs to the IT unit was history. Similarly, the relationship with the UNDP offices that was 'vague' to the new team was severed. A 'skeleton' global network composed of the UNDP stayed alive with a recently secured donation from the EU. On the local network side, manual back-office work re-appeared and the IT unit's members dwindled in numbers and power, caused by the reduction of pay, the lack of services' need after resorting to manual work, and the loss of political support, which forced the near disintegration of the whole change team responsible of translating the interests of the local network. The failure to mobilise the global and local networks led to one conclusion; the end to the automation effort.

For the span of two years the e-MoF trajectory was doomed. One exiting advisor to the ex-Finance Minister mocking the austerity measures taken by the new government said:

'At that time, I could compare our administration's style and theirs as follows, we believe that modernisation is like driving a car where you need to look in the windshield and drive forward, while on the contrary, their idea of governance is by looking in the rear view mirror and try to move forward; this will back fire on them eventually and we, during their rein on power, did not stop our modernisation efforts but rather were preparing for the moment we are voted back in office to continue where we left off.'

Despite the gloomy picture presented above, the sheer size of the workload, and the MoF employees' perceived efficiency of the programs used in years 96 to 98, the administration found it hard to resort to manual work in all the offices and MoF directorates. The inability to produce the regular financial annual charts forced the need for automation to be back on. The software used and the IT unit maintaining the systems were re-considered as a solution. It was clear to the then new administration that the electronic aspect in the MoF is to emerge as the obligatory point of passage; this prompted the legalisation of an IT unit cadre with re-instatement of spiffs and allowances, legalised now though, and boosting the unit's number to thirty five. In analysing this change of heart, it can be argued that this can be considered as technological determinism forcing the social to accept technology driven alignment in the local network despite the security arguments raised by politicians running the government at the time and their proxy in the administration at the MoF.

In 2000 (phase IV), the government changed hands again, with a clear mandate this time around. A very strong global network was re-assembled, made up of the Prime Minister, the Minister of Finance, MoF advisors whose offices were placed in the Ministry itself, and the now strong UNDP offices. On the local level the LIFMIS produced by the IT unit, and found to be a need by the exiting government, imposed itself as an OPP for all stakeholders. This helped in the re-mobilisation of the local network, feeling proud in owning the IT artefact, which started hiring, yet again, to beef up the newly legalised cadre. The mobilisation of the global network was re-enforced by CIDA joining efforts with the MoF to produce yet another taxation reform component, namely the VAT application. The rejectionist network in the local network was disaggregated and its ability to cause any pause was rendered very weak due to the lack of political clout of support.

Even their senior members were by-passed by the new regime in the MoF voted in by the recent elections.

Web electronic filing was introduced during the span of ten years (2000-2010) with many improvements and enhancements to the software produced in the MoF and the road to a fully integrated LIFMIS was almost complete. The strong networks formation, albeit locally and globally, paved the way to a fairly acceptable integrated system. This was achieved due to the translation in action of the stakeholders as shown in fig 4.4 below:

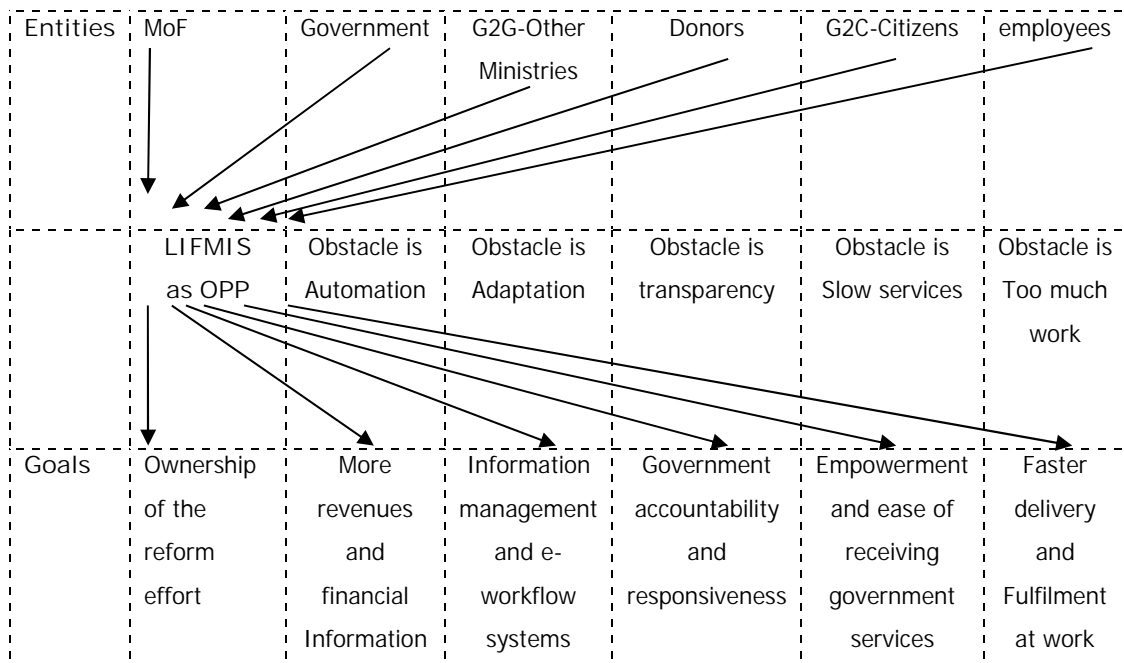


Fig 4.4: Translation in Action (adapted from Callon 1986)

Tables 4.6 below, adapted from Law and Callon (1992, p. 43) with some modifications, shows the shaping of the LIFMIS trajectory pointing to the way in which the social and the technological were interwoven (the essence of the Socio-Technical Theory) throughout the process. Based on the qualitative data collected by the researcher during the span of four years

and after interviewing various stakeholders in the Ministry, coupled with documentary evidence collected throughout the process, a categorisation of actors as interested, hostile, or neutral was tabulated for each of the nodes labelled on figure 4.2 in the different stages listed.

| LIFMIS trajectory phases and nodes | Interested network actors | Hostile network actors | Network interrelation and determinism | Neutral actors |
|--|---|---|---|--|
| Phase I: 93-95 <ul style="list-style-type: none"> • Data entry • Early attempts to introduce technology | Global network <ul style="list-style-type: none"> • MoF leadership focused on modernisation Local network <ul style="list-style-type: none"> • Small team assembled from expatriates to do the work | Potential local network (blocked) <ul style="list-style-type: none"> • Sceptical tax administration management wary about the loss of power • Other Ministries uncertain about changes | <ul style="list-style-type: none"> • Global network forming with wary local network; loosely connected • Both networks wants to be an amalgam of networks to acquire power | MoF Lack of: <ul style="list-style-type: none"> • Technical staff • IT infrastructure • Physical assets such as buildings and offices |
| Phase II: 95-98 <ul style="list-style-type: none"> • Capacity building • Infrastructure work • Training institute • Laws enacted • Tax-Solve off the shelf attempted solution • SIGTAS system • 'Lebanese' SIGTAS | Global network <ul style="list-style-type: none"> • MoF leadership, OMSAR & UNDP focused on capacity building • CIDA & SOGEMA interested in tax solution Local network <ul style="list-style-type: none"> • MoF employees • Other Ministries • IT unit | Global network OMSAR (blocked) Local network <ul style="list-style-type: none"> • Some MoF employees feeling bypassed by the new system • SIGTAS original form not accepted by MoF | <ul style="list-style-type: none"> • OMSAR refused as an OPP by the MoF leadership • SIGTAS in its international form not accepted as OPP • IT unit modified SIGTAS and forced 'Lebanese' SIGTAS as OPP for tax collection | <ul style="list-style-type: none"> • Other Ministries • Line staff (users) • Citizens (supposed beneficiary) |

Table 4.6: The shaping of the LIFMIS as a function of networks and the interwoven relationship (phase I & II)

| LIFMIS trajectory phases and nodes | Interested network actors | Hostile network actors | Network interrelation | Neutral actors |
|--|--|--|---|---|
| <p>Phase III: 98-2000</p> <ul style="list-style-type: none"> • Halt of IT efforts • Return to manual work. • Realisation that IT and automation in the MoF is a must (late 2000) | <p>Global network</p> <ul style="list-style-type: none"> • MoF leadership changed. • UNDP barely kept alive by EU donation. <p>Local network</p> <ul style="list-style-type: none"> • IT unit barely afloat by few dedicated officials | <p>Global and parts of local network (blocked)</p> <ul style="list-style-type: none"> • Old management regain power | <ul style="list-style-type: none"> • Global network lost the link to MoF officials. • Attempts by new Global network to drop the IT unit from the local network. • MoF felt, through ICT determinism. The need to use ICTs in MoF. | <p>MoF:</p> <ul style="list-style-type: none"> • Line staff (users) • Citizens |
| <p>Phase IV: 2000-2010</p> <ul style="list-style-type: none"> • Intense development of different software for all departments at the MoF (in-house). • VAT by SIGTAS introduced. • In-house customisation of VAT software. • ICT infrastructure enhanced. • Modules integrated towards the LIFMIS | <p>Global network</p> <ul style="list-style-type: none"> • MoF leadership, CIDA & UNDP focused on full MoF automation. • CIDA & SOGEMA interested in VAT tax solution <p>Local network</p> <ul style="list-style-type: none"> • MoF employees • Other Ministries • IT unit working on updating older version of the software. | <p>Elements in the local network (blocked)</p> <ul style="list-style-type: none"> • Some MoF hostile employees were muted despite their rejection to the modernisation plans. | <ul style="list-style-type: none"> • IT unit software forced and accepted as OPP for all MoF departments and for other Ministries. • Global and local network both have now the same vision and working together in harmony. | <ul style="list-style-type: none"> • Line staff (users) • Citizens (supposed beneficiary) |

Table 4.6: The shaping of the LIFMIS as a function of networks and the interwoven relationship (phase III & IV)

4.3.0: Investigating networks and power

In ANT literature, and moving away from the local and global network construct, there exist key concepts that must be looked at in order to understand the power and networks formation from an ANT perspective. The sequence is in the formation of the actor-networks, then the translation and alignment of actors in each of the networks towards one theme, hence inscription is achieved and finally irreversibility occurs (Monteiro and Hanseth 1995). In other words, actors in the networks, especially in public institutions, are supposed to work with the standardised authoritative legitimate power in a government hierarchy. The essence of public servants refer to this, as the standard operating procedure, yet from the investigation conducted at the MoF, 'power over' by virtue of the command structure, was not so vivid. To the contrary, lower ranking officials armed with IT knowledge and the understanding of the technological artefacts, obtained 'illegitimate' power. For example, the IT unit who was supposed to be under the rein of the MoF managerial leadership, gained respect and attention from the Finance Minister himself and consequently claimed 'power to' from higher authority (Prime Minister and his advisors who are part of the global network) and bypassed its direct chain of command. The example was seen as giving 'power to' actors in the local network by injecting actors in favour of the global network's interest and thus relinquishing the 'power over' that existed in a mechanistic organisation.

Some may argue that this power is also 'power over' and not 'power to' attained by the IT unit since the finance Minister is considered as upper management and was in favour of giving such responsibility to the IT unit; however, when the MoF management and the Prime Minister himself were changed between 98 and 2000, the 'power to' by the IT unit was actually

legalised after it was realised that the inscribed automated workflow process was current, addresses the problems, and irreversible.

4.4.0: Narrative Analysis and the search for the absolute truth

Since one of the aims of the qualitative research was to find out if the EGIS programme implementation was beneficial for the MoF or not, the study resorted to several interviews with two groups of actors (from the 14th of March and 8th of March movements) to try to understand their accounts of the degree of success attained by the programme implementation. The transcripts from the interviews, the story extracted, and the analytic notations emerged are tabulated in 4.7 below:

| Interview Data | Story | Analytic Notations |
|---|---|--|
| 'It is true I am his (an IT unit member) superior, but if I don't agree on something, he can write directly to the advisor to the Minister and can make things go through without even my blessings'. | Power-over and power-to being played during the research period | A manager feels loss of authority and hence sees no benefit from EGIS except the loss of authority |
| 'I don't even know what they do in that unit'. | Not in the loop on technology advancement | No communication between the units |
| 'Go interview them, let them exaggerate their work that is full of bologna'. | Complete disbelief in the IT unit's efforts | Mistrust and a wall erected between the factions |
| 'We still run all back-office work manually since we don't trust their IT technical skills | Double the workload National security issues raised and hints that the 'others' are leaking | Ignoring the EGIS outcome Labelling the EGIS as |

| | | |
|---|---|--|
| <p>or even the people running the unit themselves, honestly we don't even know where the Financial information is ending up at'.</p> <p>'Their systems crash and maintenance for the software is nil'.</p> <p>'Lots of talk up there but no substance'. (IT unit offices are located upstairs in the same MoF building)</p> <p>'Go get some major show-off presentation from them'.</p> <p>'Can you imagine some IT unit's official make twice in salary as the highest paid individual in the Ministry? It is ridiculous'.</p> | <p>information to the 'enemy'</p> <p>Accusation of malfunction of the local and international software</p> <p>IT unit speaks a "show off" language</p> <p>The HR allowed the salary figures in the open and some were not happy with the IT unit personnel salaries</p> | <p>security breach and the people handling it are almost accused of treason</p> <p>Disbelief in the abilities by the IT unit and the UNDP offices</p> <p>Try to discredit the IT before the researcher gets to meet with them</p> <p>Envy against the people who are younger and IT savvy making more money than older folks</p> |
| <p>'I am sorry you are witnessing such management incidents'. (The official was referring to the researcher's inability to interview employees except after a long wait and a lengthy paper work procedure that went wrong several times due to the English written request rather than a request in the local language-that caused a delay of 3 weeks in getting</p> | <p>An official in the IT unit apologises for being unable to officially conduct an official meeting without the proper documents with management signature of approval</p> | <p>Bashing bureaucracy and the use of paper work (not digital means) in order to obtain a very simple matter. There was also allusion to the older team not understanding English which seem to delay the approval</p> |

| | | |
|--|---|---|
| <p>permission to interview personnel at the IT unit)</p> <p>'It is sad but true to have such characters in the MoF (referring to the older generation in the TA offices), but this is what we face daily'.</p> <p>'I am trying to be professional but they don't seem to understand what we do, or even want to understand'.</p> <p>'Am not sure what will happen to us (in the IT unit) when there is a political shift in the country'.</p> <p>'At that time, I could compare our administration's style and theirs as follows, we believe that modernisation is like driving a car where you need to look in the windshield and drive forward, while on the contrary, their idea of governance is by looking in the rear view mirror and try to move forward; this will back fire on them eventually and we, during their rein on power, did not stop our modernisation efforts but rather were preparing for the</p> | <p>A referral to the big gap between the two factions</p> <p>Trying to explain to the other side the role of the IT unit, but falling on deaf ears</p> <p>IT unit working under a cloud of fear for being fired in a political power shift</p> <p>Denoting their strategy as going forward while the anti-EGIS want the country to go backwards.</p> <p>Belief that even after a loss of political clout, the sheer size of the work load will force the EGIS programme back on track</p> | <p>Daily arguments seem to be the way of doing things at the MoF</p> <p>Rejection to the IT solution despite an outcry by the IT unit about the benefit of such programme</p> <p>Job insecurity for all IT unit employees</p> <p>A clear indication that there are two accounts of EGIS benefits and both accounts are on either side of the spectrum without any middle ground</p> |
|--|---|---|

| | | |
|--|--|--|
| moment we are voted back in office to continue where we left off.' | | |
|--|--|--|

Table 4.7: Narrative Data Analysis

The first column in the table listed the transcribed tapes from the 8th of March movement (1st row) and 14th of March (2nd row) respectively. The 2nd column in the table summarised the main idea from the transcribed narration. While the 3rd column showed the analysis of each of the narration relative to the subject matter (benefit of the EGIS programme in the MoF). From the analytic notation column it is obvious to the reader that there exist two opposing stories between two teams in the same ministry. The words reconstructed reality in the minds of the interviewees and the emotion when delivering the story tells the listener that the story is coming from the heart and it is indeed the reality that they constructed, see, and believe in. This is not out of the ordinary as McCormack (2000) stated: "stories are not told in vacuum –they are simultaneously situated within a particular context (situation) and within a wider cultural context....the context of culture is the social, political, cultural, historical, and structural conditions of the wider society in which the stories have been experienced, told, and retold. Looking through this lens highlights the social constructions of reality held within the prevailing cultural fiction" (P. 287).

These truths baffled the researcher due to the fact that both came from high ranking officials in the same ministry, yet each told completely different accounts of the value and the use of the EGIS. The author realised that these truths would have to be reconciled somehow or at least some form of absolute truth must come out. The interviews gave an inconclusive answer

to the effect of EGIS on the MoF and hence other means to inspect or gauge this impact would have to be entertained for completeness of the research.

4.5.0: Conclusion of the qualitative work

In the literature review section of this study, end users and beneficiaries' involvement was seen as crucial to the success of the e-Gov application. It was discovered in this study however, that these involvements were not considered in the design of the information system, in spite of the humble involvement of a small number of the IT unit's staff in filling some positions as tax administrators. MoF officials, close to the government and the global network as a whole, claim that the e-MoF is a success story. That similar claim is rebuffed by the MoF managerial staff, even at the highest rank.

Finding out which claim is more objective was seen as a challenge by the researcher. The two networks that were not yet investigated (users and beneficiaries) were deemed crucial for the clarification of the whole picture. Due to the lack of resources, the beneficiaries (citizens-G2C, the businesses-G2B, and the other Ministries and local governments-G2G) were not investigated in the research; it was only the end users' perceived effectiveness that could be ascertained to try to stamp a success or failure level on the project, objectively.

In other words, the qualitative work was seen as inconclusive to the understanding of the e-MoF trajectory path. The trajectory of the project showed the longitudinal evolution but the so called 'final node' is never the final node due to the ongoing political wrangling, networks formation, information and technology advancement, and managerial and project's

evolution. By the same token, the qualitative study added more questions to the research effort, namely:

4.4.1.1: Are the majority of employees at the MoF young, educated, and computer savvy?

4.4.1.2: Are the training and institutional practices adequate to prepare public employees for the mission?

4.4.1.3: Did automation reduce the workload?

4.4.1.4: Were the ICT environments adequate to automate the workflow?

In turn, this necessitated a quantitative study that was conducted following this qualitative part, based on information gathered from this investigation, and the details are presented in the next chapter.

CHAPTER FIVE

DATA ANALYSIS II: QUANTITATIVE

THE PERCEIVED IMPACT OF ICT ON THE USERS OF THE LEBANESE MINISTRY OF FINANCE

5.0: Introduction

In this chapter of the thesis, the basic build-up and final shape of the research instrument developed, is explained in detail at the start of the chapter. Then, the data collection techniques and analyses of the data are presented. Finally, the chapter ends up with a brief analysis and conclusion about the quantitative work.

The need for a quantitative study was substantiated by the many remaining questions posed throughout this research effort. The quantitative effort was launched to try to assess the employees' perceived effectiveness of ICT empowered means at the Lebanese Ministry of Finance. It was also crucial in evaluating the propositions presented in section 3.2.2 and 3.2.3:

- III. ICT improved information quality
- IV. ICT improved service delivery to citizens
- V. ICT has had a positive impact on the functioning of the Lebanese MoF
- VI. ICT improved revenue generation at MoF
- VII. The level of success given by trajectory mapping technique has a direct causal effect on the impact of an EGIS

In addition to clarifying the proposals suggested, more questions became apparent while conducting the qualitative part of this research. These new questions can be summarised as follows (taken from chapter four):

4.4.1.1: Are the majority of employees at the MoF young, educated, and computer savvy?

4.4.1.2: Are the training and institutional practices adequate to prepare public employees for the mission?

4.4.1.3: Did automation reduce the workload?

4.4.1.4: Were the ICT environments adequate to automate the workflow?

Furthermore, it is also aimed at evaluating the results obtained from the trajectory's plotting of the 'final node', presented in fig 4.2 and therefore answering the proposition VII in 3.2.3 section C. The node that lies in the positive quadrant of the graph shows the success level of the design and implementation, and hence the use of the ICT artefacts and how the work flow has been affected by the introduction of such technologies. That node and its position on the graph required some empirical testing to substantiate the value associated with it, hence, the quantitative effort of this project.

The first logical step was to obtain the description of the respondents to confirm the information provided by interviewees, from upper management, conducted at earlier stages of the research. To that end, the age, the tenure, the level of education and other information were asked in section A of the questionnaire to validate the claims that most employees at the MoF were young, educated, and highly trained.

Then, based on Orlikowski's Model of Technology developed in 1992, the researcher built a model, based on the validated conceptual work of Tseng (2008), and considered the relative elements of the local contextual factors obtained from the qualitative investigation vis a vis three factors, namely: ICT cognition (factor B), institutional properties (factor C), and ICT environments (factor D). The three factors are believed to shape and affect the quality of the software produced (Factor E) that workers are using (Orlikowski 1992; Tseng 2008). Literature review allowed for the selection, of validated items/questions (statements/questions to be evaluated by users) to utilise in the six factors model selected, namely: three contextual factors (B-C-D), the quality of the software thus produced (E), the perceived effectiveness of employees toward the claims of better service delivery to citizens (Factor F) and improved functionality at the Ministry after the ICT implementation (Factor G). Factors B, C, D, and E were investigated by 6 items each (B1 to B6), (C1 to C6), (D1 to D6), and (E1 to E6) respectively, while factor F was investigated by 5 items and factor G by 7 items. Below is an illustration of the proposed model depicted with the number of items:

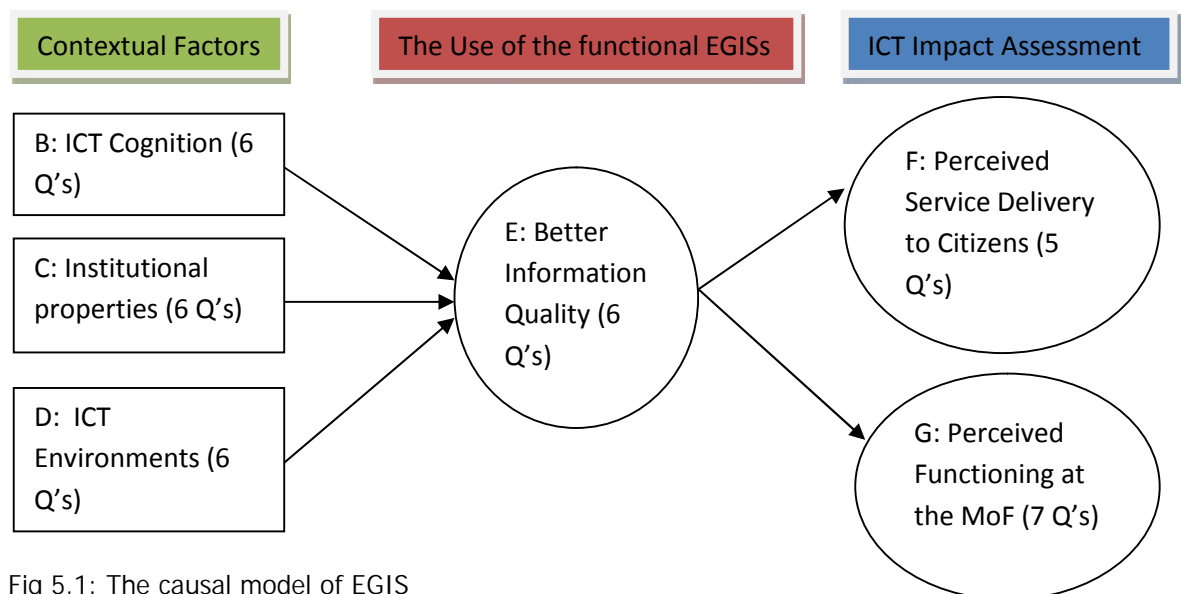


Fig 5.1: The causal model of EGIS

Finally, to assess proposition VI and VII, secondary data was obtained from the MoF website in regards to revenue generation and from the IMF website concerning the Lebanese GDP during the last 12 years (1998-2009).

5.1.0: Methods and Data Collection

A pilot was conducted to assess the possible problems with the research instrument as described in chapter three. Item B4 on the questionnaire dealt with bureaucracy and its variation by the use of ICT. The word bureaucracy and its translation to the local language did not register with most employees in the pilot study. Similarly, items B5 'I think ICT can promote fulfilment at work' and B6 'I think ICT can foster social development' were also problematic to the public workers piloted. This may be due to the different meaning associated with the word 'fulfilment' (B5), which does not have a strict translation that makes sense in the local language. By the same token, 'foster social development' was not fully understood by some workers. However, removal of the questions from the questionnaire was blocked by administration's officials who insisted on using the original form of the questionnaire, that 'permission to conduct a survey' was issued by Lebanese authorities and, therefore, no alteration is allowed. A statement by the revenue collection chief was added to support not eliminating any questions,

'All our public servants are highly educated and should know the meanings of these words'.

The survey took place in three provinces: Tripoli was conducted first; Beirut, which included the large taxation unit (LTU) recently established and housed in the Beirut directorate, second; and finally, Mount Lebanon was surveyed. The sequencing in surveying was due to political/administrational reasons

beyond the researcher's control. Tripoli was surveyed by the researcher himself using hard copies of the questionnaires distributed by hand with the help of people allocated by the director of the Tripoli taxation centre, while Beirut and Mount Lebanon officials rejected the idea of physical interaction and instead e-mailed the questionnaire from the revenue chief's personal assistant directly to all employees of the two provinces. The Tripoli effort went smoothly with an adequate response rate (81/120), while the other two provinces took considerable time to be printed, filled and collected, with enforcements, to do just that, every other week. However, questionnaires were slow in coming and it was only after the intervention of the revenue collection chief himself, big numbers appeared and the response rate went up considerably (refer to table 3.2 for individual provinces' response rate). Although there is a potential bias in data collection due to the interference of the revenue collection chief in the email process, however, the mandate from the chief to all employees in Beirut and Mount Lebanon directorates to comply with the researcher's questionnaire only aided a swift response to the questionnaire as it was clear to all employees in all the provinces that the survey efforts was by the hospices of the revenue department chief's blessings. In other words, the Revenue Chief's note sent to employees in Beirut and Mount Lebanon was simply to give the time (the two directorate has the most work in the country) to fill up the applications despite the heavy work-load. Looking back at table 3.2 on page 143, the usable questionnaires from Tripoli were 80 from 86 returned giving a 93% of sincerity by employees given to the questionnaire. Comparing this percentage of the sincerity by employees to the questionnaire in Beirut (150 out of 157) 95.5% and Mount Lebanon (102 out of 115) 88.69% to that of Tripoli (80 out of 86) 93%, one can argue that the chief's email, despite adding more returned questionnaires in the two provinces, yet the usability of the returned questionnaires was within 5% in each of the provinces. This simply implies that the email by the chief did not have an impact on the

sincerity of the returns and hence, the supposed bias in the data collected in Beirut and Mount Lebanon had little impact.

Information obtained from the questionnaire was analysed through the use of the Statistical Package for the Social Sciences (SPSS) in order to generate Univariate and bivariate analyses in the forms of frequency tables and bar charts. Then the same software was used to check the reliability of the questionnaire relevant to the respondents. Information from the questionnaires was entered into SPSS software to run the needed statistics. A total of 332 records were inducted in the system where frequency statistics were obtained to section 'A' of the questionnaire as shown in figure 5.2 below:

| | | | | | |
|----|--|------------|------------|---------------|-----------|
| A1 | Which revenue directorate building do you work at? | VAT Bldg | BEIRUT | MOUNT LEBANON | TRIPOLI |
| | | € | € | € | € |
| A2 | Do you use a computer at work? | yes | no | | |
| | | € | € | | |
| A3 | What is your gender? | Male | Female | | |
| | | € | € | | |
| A4 | What is your level of education? | HS | College | University | Masters |
| | | € | € | € | € |
| A5 | Tenure in years | <5 | 5-10 | 11-15 | >15 |
| | | € | € | € | € |
| A6 | What is your age? | 21-25 | 25-34 | 35-44 | >45 |
| | | € | € | € | € |
| A7 | Your position at the organisation? | Line staff | Supervisor | Middle mgt | Executive |
| | | € | € | € | € |

Fig 5.2: Section A from the Questionnaire

5.2.0: Data Description and Validation

The first step in getting information from the data collected was to conduct frequency statistics.

| | N = 332 Total | Mean | Percentage |
|--------------------------|---------------|------|------------|
| Gender | | 1.46 | |
| Male | 180 | | 54.2 |
| Female | 152 | | 45.8 |
| Education | | 3.07 | |
| High School | 5 | | 1.5 |
| College | 41 | | 12.3 |
| Bachelor | 212 | | 63.9 |
| Masters | 74 | | 22.3 |
| Tenure | | 2.50 | |
| Less than 5 | 65 | | 19.6 |
| 5-10 | 102 | | 30.8 |
| 11-15 | 99 | | 29.9 |
| More than 15 | 65 | | 19.6 |
| Age | | 2.60 | |
| 21-25 | 16 | | 4.8 |
| 26-34 | 141 | | 42.6 |
| 35-44 | 135 | | 40.8 |
| More than 45 | 39 | | 11.8 |
| Rank in the Organisation | | 2.27 | |
| Line staff | 6 | | 1.8 |
| Administrative staff | 228 | | 69.9 |
| Supervisory staff | 91 | | 27.0 |
| Executive staff | 1 | | 0.3 |

Table 5.1: Demographics of respondents:

A summary, table 5.1, is presented above taken from the report generated from SPSS describing in percentage of frequencies of the responses obtained for each item of the proposed model (refer to appendix SPSS-1 for the rough draft). The mean, mode, standard deviation, and bar graphs were also generated to portray a pictorial image of the responses in a brief manner. The mean values presented in table 5.1 supports officials' claims that the workforce is young (2.60/4), highly educated (3.07/4), and their tenure at the organisation corroborate the story line of the hiring process during the past 15 years. This answers question 4.4.1.1 in section 5.0

above; what remains are the rest of the questions and proposals. These are ascertained in the next few sub-sections of this chapter.

Data validation was seen as the natural next step in this endeavour. Despite the fact that the items on the questionnaire were almost all validated from previous studies (Byrd and Turner 2000; Lai et al. 2005; Yi et al. 2006; Tseng 2008; Prybutok et al. 2008), yet those studies were conducted in different environments and perspectives and a validation for the proposed model within the Lebanese context was deemed necessary.

Internal data consistency for the multi-item scale of the proposed six factors was carried out by finding the Cronbach's alpha coefficient for each of the proposed factors. The threshold value of 0.7 of the Cronbach's reliability coefficient for each of the factors was sought where internal consistency is said to be valid beyond that number (Range and Antonelli 1990).

```

** Method 1 (space saver) will be used for this analysis **

  R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   ( A L P H A )

Statistics for          Mean      Variance      Std Dev      N of
SCALE                 22.6435    13.3947      3.6599      Variables
                                                6

Item-total Statistics

                Scale          Scale          Corrected          Alpha
                Mean          Variance          Item-              if item
                if Item        if Item          Total              Deleted
                Deleted        Deleted        Correlation

B1                18.9274          9.4093          .5073              .6136
B2                19.4858          9.1367          .4460              .6352
B3                18.4196          10.2316         .5223              .6209
B4                19.0757          10.2727         .2637              .7023
B5                18.5962          10.3491         .4403              .6400
B6                18.7129          9.9205          .3856              .6552

Reliability Coefficients

N of Cases =      317.0                N of Items =      6

Alpha =          .6857

```

Table 5.2: Cronbach's alpha for factor B from SPSS output

For factor B as shown in table 5.2, the Cronbach's alpha coefficient with all the items included was considered low (<.7) and the validity of the B factor was 'questionable' (Gliem and Gliem 2003, p. 87). However, by looking at the column titled 'alpha if item deleted', which indicates that if one of the items were to be deleted, then Cronbach's alpha coefficient will rise up to the inscribed number. Item B4 not surprisingly was the culprit. Furthermore, looking at the 'corrected total correlation' for item B4 (0.2637) indicating a weak item correlation and ultimately can be dropped from the questionnaire. By eliminating the B4 item, the Cronbach's alpha coefficient went up to 0.7121, beyond the accepted value, as shown in table 5.3 below:

```

** Method 1 (space saver) will be used for this analysis **

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   ( A L P H A )

Statistics for          Mean      Variance      Std Dev      N of
SCALE                 19.0408     10.5927       3.2546       Variables
                                                5

Item-total Statistics

                Scale          Scale          Corrected          Alpha
                Mean          Variance          Item-              if Item
                if Item       if Item          Total              Deleted
                Deleted       Deleted          Correlation

B1                15.3292          6.7813           .5616              .6247
B2                15.8871          6.8237           .4334              .6856
B3                14.8245          7.6672           .5394              .6456
B5                15.0031          7.7830           .4437              .6750
B6                15.1191          7.2814           .4123              .6892

Reliability Coefficients

N of Cases =      319.0                N of Items =      5

Alpha =          .7121

```

Table 5.3: Cronbach's alpha coefficient after B4 was deleted from the items

Items proposed for the different factors in the suggested model were exposed to the same statistical technique in order to assess the Cronbach's alpha coefficient. Ultimately, the remaining five proposed factors in the model scored a Cronbach's alpha coefficient above .7, validating the internal data consistency for the multi-item scale proposed.

Table 5.4 shows a summary of the six proposed factors with their corresponding Cronbach's alpha coefficient, taken from the SPSS generated output (refer to appendix SPSS-2 for raw SPSS data of Cronbach's alpha coefficient).

| Factor | Cronbach's alpha coefficient by SPSS |
|--------|--------------------------------------|
| B | .7121 |
| C | .8184 |
| D | .8973 |
| E | .8745 |
| F | .8167 |
| G | .8255 |

Table 5.4: factors and their Cronbach's alpha coefficient

With the number of items in the questionnaire (36), coupled with the untested proposed model in the Lebanese context, data cleansing, item elimination, and grouping of complex variables into latent variables was the next logical step in the data analysis process. For the six factor model proposed, Factor Analysis (FA) was sought as a suitable venue. Factor analysis is defined as:

‘A method for determining the number and nature of the underlying variables among larger numbers of measures. It is a method for determining k underlying variables (factors) from n sets of measures (items). It may also be called a method for extracting common factor variances from sets of measures’ (Kerlinger 1973, p. 659).

In other words, FA is used to group several items in any questionnaire into a smaller number of factors that the items seem to load on. Therefore, for the research instrument used, two complimentary methods were utilised, a preliminary Exploratory Factor Analysis (EFA) to check the appropriateness factor extraction via this method, then Factor Analysis (FA). Factor analysis

| Component | Initial Eigenvalues | | Cumulative % | Extraction Sums of Squared Loadings Total | % of Variance | Cumulative % |
|-----------|---------------------|---------------|--------------|---|---------------|--------------|
| | Total | % of Variance | | | | |
| 1 | 12.417 | 34.490 | 34.490 | 12.417 | 34.490 | 34.490 |
| 2 | 2.437 | 6.770 | 41.260 | 2.437 | 6.770 | 41.260 |
| 3 | 2.096 | 5.821 | 47.081 | 2.096 | 5.821 | 47.081 |
| 4 | 1.820 | 5.055 | 52.136 | 1.820 | 5.055 | 52.136 |
| 5 | 1.377 | 3.824 | 55.960 | 1.377 | 3.824 | 55.960 |
| 6 | 1.181 | 3.281 | 59.241 | 1.181 | 3.281 | 59.241 |
| 7 | 1.106 | 3.071 | 62.312 | 1.106 | 3.071 | 62.312 |
| 8 | 1.037 | 2.880 | 65.193 | 1.037 | 2.880 | 65.193 |
| 9 | .910 | 2.527 | 67.720 | | | |
| 10 | .900 | 2.501 | 70.221 | | | |
| 11 | .856 | 2.378 | 72.599 | | | |
| 12 | .792 | 2.201 | 74.801 | | | |
| 13 | .734 | 2.040 | 76.840 | | | |
| 14 | .666 | 1.850 | 78.690 | | | |
| 15 | .630 | 1.750 | 80.440 | | | |
| 16 | .565 | 1.570 | 82.010 | | | |
| 17 | .511 | 1.420 | 83.429 | | | |

Table 5.5: Extraction Method: Principal Component Analysis from Appendix SPSS-3

requires a large sample to obtain a stable solution. However, literature did not provide any absolute criterion of what a 'large sample' is. A sample above 250 responses is said to be adequate for factor analysis (DeCoster 1998). The sample size in this effort was 332; well beyond the threshold suggested. The 36 items were subjected to principal component analysis (PCA) using SPSS and allowing all items to load freely. The first run of EFA gave an 8 component solution that explained 65.2% of the variance as presented in table 5.5 above (full SPSS output is in Appendix SPSS-3). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value was .916, exceeding the recommended value of .6, while the Bartlett's test of Sphericity (Chi-Square) attained statistical significance, which is an indication that the correlation matrix is factorable by using factor analysis. Accordingly, for the proposed research model depicted in fig 5.1, exploratory and confirmatory factor analysis (EFA and CFA) techniques were then performed on two sets of the data corresponding to the proposed factors B-C-D and E-F-G, respectively; this will be further elaborated below.

5.2.1.0: EFA AND FA for the Contextual Factors B, C, and D

First the researcher grouped the contextual factors together and EFA was performed on B-C-D allowing SPSS to extract factors with Eigenvalues of significance greater than 1 (full SPSS output in Appendix SPSS-4). KMO was calculated at .887 and Chi-Square at 2246.3 (adequate for CFA technique) and four factors were extracted explaining 62.7% of the variance. The scree plot obtained (fig 5.3) and the values of the communalities, however, suggested that three factors would be a more suitable result. In addition, the component matrix showed that some items loaded on two different factors with almost the same load.

CFA was then performed on the same items corresponding to the proposed factors B-C-D. Principal component method was also used as an extraction

method with limiting the extraction to three, with Varimax rotation and a suppression of coefficients of absolute value less than .4 (loading above .4 is considered to be high by DeCoster 1998). One more item (C5) loaded on two different factors and was consequently removed (SPSS output draft is available in Appendix SPSS-5).

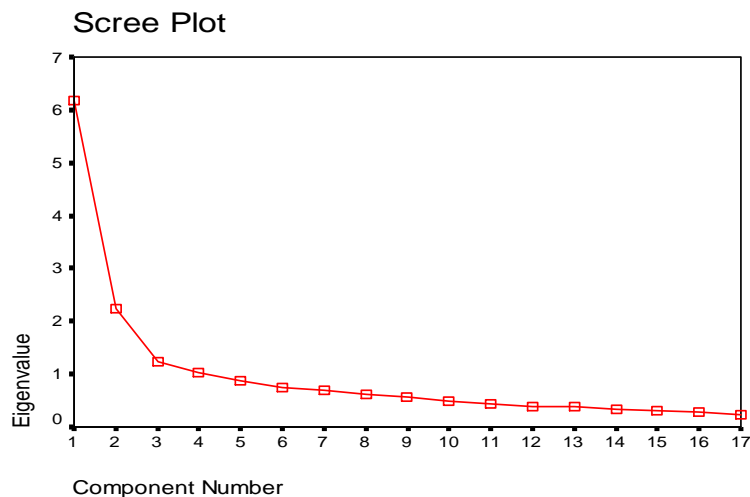


Fig 5.3: scree plot for EFA on B-C-D showing 3 factors with Eigenvalues above 1

In inspecting the rotated factor matrix generated from SPSS output (Appendix SPSS-5); three factors could be identified clearly. Firstly, Items D1 to D6 loaded on factor 1 with highest load concentrated on D2 (I am satisfied with the system's ease of use). Keeping in mind that one of the purposes of factor analysis is to reduce multiple items into a 'simple structure'. The loadings of D-items on D2, supports the naming of the factor by the researcher as 'ICT environments' and hence the name stands. Secondly, looking further at the rotated factor matrix, items C1 to C4 all loaded on factor 2 with C2 (Our organisation offers various types of ICT training programs) as the highest recorded factor loading. Again this is a re-assurance that the factor C, named 'institutional properties', subsumes that name. Thirdly, for items B1 through B6 (excluding B4), they all loaded on factor 3 with B3 (I like to experiment with new ICTs) confirming again the

name proposed for the B factor as 'ICT cognition'. Table 5.6 shows the rotated factor matrix.

Rotated Component Matrix ^a

| | Component | | |
|--|-----------|------|------|
| | 1 | 2 | 3 |
| B1: If I heard about a new information technology, I would look for ways to experiment with it | | | .785 |
| B2: Among my peers, I am usually the first to try out new information technology | | | .660 |
| B3: I like to experiment with new ICT | | | .781 |
| B5: I think ICT can promote fulfilment at work | | | .553 |
| B6: I think ICT can foster social development | | | .559 |
| C1: I believe that top management in our organization supports the ICT app | | .655 | |
| C2: Our organisation offers various types of ICT training programs | | .802 | |
| C3: The training programs conducted were job related | | .738 | |
| C4: Our organisation appraises ICT literacy of employees | | .675 | |
| C6: Our ICT service desk does a great job in answering ICT related problems | | .515 | |
| D1: I am satisfied with the reliability of the system. | .766 | | |
| D2: I am satisfied with the system's ease of use. | .818 | | |
| D3: I am satisfied that the system is always accessible. | .784 | | |
| D4: I am satisfied with the system's packaged software. | .768 | | |
| D5: I am satisfied with the system's processing speed. | .744 | | |
| D6: I am satisfied with the system's network environment | .748 | | |

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table 5.6: Rotated component matrix of B-C-D from Appendix SPSS-5

5.2.1.1: Findings from FA of B, C, and D Results

These findings contradict with the model suggested by Tseng (2008). Whereas, Tseng suggested several contextual factors that were eventually dropped after conducting empirical analysis; this research's contextual factors were solid and most of the items supported the factors proposed. This is believed to be due to the fact that the items describing the contextual factors were chosen after the qualitative part of the research was conducted; giving the author a clear idea of what is a 'local factor' and what is not, and should be excluded. This is to show that the qualitative part was necessary for designing the questionnaire in a manner that suits the situation at hand. Furthermore, the interviews conducted earlier allowed for the understanding of what artefact is in use for a longer period of time so as items could be conditioned accordingly. To summarise the 'contextual factors' findings, it can be fairly stated that the longitudinal trajectory analysis enlightened the author on what to include on the questionnaire and what not to. In addition, it also allowed for understanding how much an IT artefact has been in use and how employees might perceive that artefact.

5.2.2.0: FA for E, F, and G

The similar procedure was performed on the remaining items of the three proposed factors E-F-G. After an EFA run, four factors were extracted explaining 66.47% of the variance with KMO of .906 and Chi-Square of 3191.58; again showing the appropriateness of using factor analysis. The scree plot in fig 5.4 below shows that, again, a three factor extraction looks more appropriate.

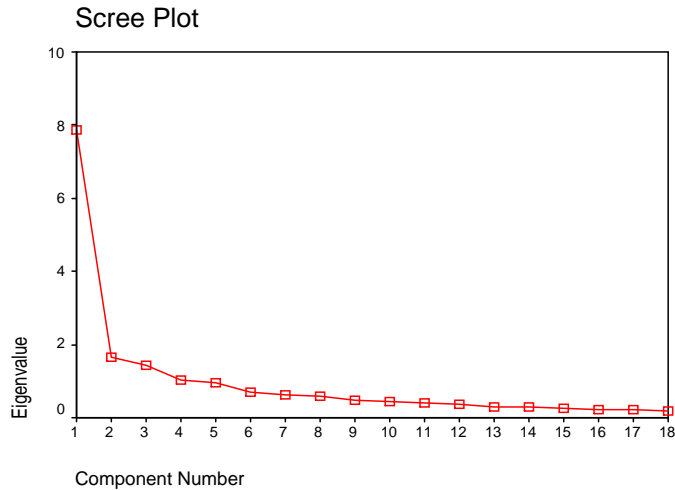


Fig 5.4: Scree plot for E-F-G after EFA

Subsequently, CFA was conducted on the data, keeping the same conditions of rotation and suppression as in the case of B-C-D, yielded a three factor extraction after dropping several items from the questionnaire, namely: F1, and G7. Unlike the perfect loading that affirmed the proposed three factors of B-C-D, items' loading on this run were not as proposed. Items that distinguished, in the anticipated model, the difference between productivity and citizens' service delivery did not hang together. Items F2, F4, G1, G2, and G3 loaded together on factor 2 while scoring the highest load on G2 (I believe ICT enabled me to do my job more quickly). Whereas, F3, G4, G5, and G6 loaded on factor 3 with high load on G5 (the web information reduced my work as a tax advisor). Table 5.7 shows the loading of items on the different factors (refer to Appendix SPSS 6 & 7 for the full output report).

| Rotated Component Matrix(a) | | | |
|---|-----------|------|------|
| | Component | | |
| | 1 | 2 | 3 |
| E1: I believe using ICT provided me with information that is useful | .795 | | |
| E2: I believe using ICT provided me with information that is accurate | .814 | | |
| E3: I believe using ICT provided me with information at the right time | .779 | | |
| E4: I believe our IT personnel understand our business functions | .625 | | |
| E5: I believe our IT personnel understand the organisation's policies and laws | .613 | | |
| E6: I believe our IT personnel are free to assist users when needed | .619 | | |
| F2: After deploying ICTs at work, we can increase public participation | | .433 | |
| F3: The Ministry of Finance's website has good information about all tax procedures | | | .547 |
| F4: After deploying ICTs at work, we can service customers much faster | | .762 | |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | | .774 | |
| G1: I believe ICT increased job productivity | | .766 | |
| G2: I believe ICT enabled me to do my job more quickly. | | .777 | |
| G3: I believe ICT improved my judgment at work | | .678 | |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | | | .775 |
| G5: The web information reduced my work as a tax advisor | | | .864 |
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | | | .800 |
| Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. | | | |
| a Rotation converged in 6 iterations. | | | |

Table 5.7: Rotated component matrix of E-F-G from Appendix SPSS-7

The items for the proposed factor E loaded together on factor 1 with highest load on E2 (I believe using ICT provided me with information that is accurate). Hence, the remaining items for the unchanged factors B-C-D-E after CFA are listed in table 5.8 below:

| | |
|----------|--|
| B factor | ICT COGNITION |
| B1 | If I heard about a new information technology, I would look for ways to experiment with it |
| B2 | Among my peers, I am usually the first to try out new information technology |
| B3 | I like to experiment with new ICT |
| B5 | I think ICT can promote fulfilment at work |
| B6 | I think ICT can foster social development |
| C factor | INSTITUTIONAL PROPERTIES |
| C1 | I believe that top management in our organization supports the ICT app. |
| C2 | Our organisation offers various types of ICT training programs |
| C3 | The training programs conducted were job related |
| C4 | Our organisation appraises ICT literacy of employees |
| C6 | Our ICT service desk does a great job in answering ICT related problems |
| D factor | ICT ENVIRONMENTS |
| D1 | I am satisfied with the reliability of the system. |
| D2 | I am satisfied with the system's ease of use. |
| D3 | I am satisfied that the system is always accessible. |
| D4 | I am satisfied with the system's packaged software. |
| D5 | I am satisfied with the system's processing speed. |
| D6 | I am satisfied with the system's network environment |
| E factor | SOFTWARE QUALITY |
| E1 | I believe using ICT provided me with information that is useful |
| E2 | I believe using ICT provided me with information that is accurate |
| E3 | I believe using ICT provided me with information at the right time |
| E4 | I believe our IT personnel understand our business functions |
| E5 | I believe our IT personnel understand the organisation's policies and laws |
| E6 | I believe our IT personnel are free to assist users when needed |

Table 5.8: Retained items from B, C, D, and E factors

The last two factors that showed discrepancy had to be altered to fit the model discovered by the data validation process. The old table looked like table 5.9 below:

| | |
|----------|---|
| F factor | SERVICE DELIVERY |
| F1 | After deploying ICTs at work, we can increase public participation |
| F3 | The Ministry of Finance's website has good information about all tax procedures |
| F4 | After deploying ICTs at work, we can service customers much faster |
| F5 | After deploying ICTs at work, we can deliver tailored services to citizens |
| G factor | IMPROVED FUNCTIONING |
| G1: | I believe ICT increased job productivity |
| G2: | I believe ICT enabled me to do my job more quickly. |
| G3: | I believe ICT improved my judgment at work |
| G4: | I believe ICT reduced our interaction with citizens due to the web offered services |
| G5: | The web information reduced my work as a tax advisor |
| G6: | Putting all the tax material on the web was a good taxpayer teaching tool |

Table 5.9: Items retained for F and G factor before name alteration

5.2.2.1: Findings from FA of E, F, and G Results

Conforming to the loading obtained after the collection of data, the names of the proposed factors were found to be obsolete, and new names were deemed needed to explain the two factors thus explored. The new induced factors were named 'increased productivity' and 'web services' respectively. Items' labelling were also changed to suit the new factor naming as shown in table 5.10.

The interesting part of the quantitative study was this new finding. The factors were proposed after the qualitative analysis was conducted. Therefore, these results were unexpected. According to the Finance Ministry's officials and senior managers, the work of the planner and the IT unit regarding the output of the software was of two folds: automating the

work process and enabling citizens to receive online services. In other words, the proposed factors were supported and corroborated by officials' recommendations. To drop the citizens' services factor completely casts a doubt on the effectiveness of the software produced for that purpose and should make officials ponder about the labour and capital invested in such an unused or un-explored service.

Providing an online service is half the work; the other half would be by allowing the services to be delivered to the intended users via technical means (ICT environments capable of handling the services adequately such as internet speed, bandwidth, etc.) and via a campaign to make people or the users aware of its presence and its effectiveness (Evans and Yen 2005). Japan, as discussed in the literature review on e-filing, made tax discounts for citizens that use the online services (Chatfield 2009). That discount was intended to lure people to use the service and hence reduce the work load on the employees. Japan is not alone in encouraging this behaviour; Western countries push for citizens to use such services to reduce the burden on the public servants. For example, the United Kingdom authorities, pushes its citizens to use online booking of sorts to pay what is called the 'internet price' or the 'online price' or the 'web price', which is much cheaper than buying the same service otherwise.

With that mentioned, the perceived effectiveness of such services by employees will only be ascertained after analysing response frequencies and that in turn, should tell if the IT unit and the managers were justified or not in their claims. This issue is further investigated in the section related to analysis of data below.

| | |
|----------|---|
| P factor | INCREASED PRODUCTIVITY |
| P1: | After deploying ICTs at work, we can increase public participation |
| P2: | After deploying ICTs at work, we can service customers much faster |
| P3: | I believe ICT increased job productivity |
| P4: | I believe ICT improved my judgment at work |
| P5: | I believe ICT enabled me to do my job more quickly. |
| P6: | After deploying ICTs at work, we can deliver tailored services to citizens |
| W factor | WEB SERVICES |
| W1: | The Ministry of Finance's website has good information about all tax procedures |
| W2: | I believe ICT reduced our interaction with citizens due to the web offered services |
| W3: | The web information reduced my work as a tax advisor |
| W4: | Putting all the tax material on the web was a good taxpayer teaching tool |

Table 5.10: The induced factors P and W after CFA

Consequently, productivity factor, or the P factor, is now described by 6 items where the highest load was shown to be on P5; and web services factor, or the W factor, is described by 4 items with the highest load on W3. Hence, the model depicted for this research shown in fig 5.1 was changed after factor analysis was conducted on the research instrument and looks now like fig 5.5 below:

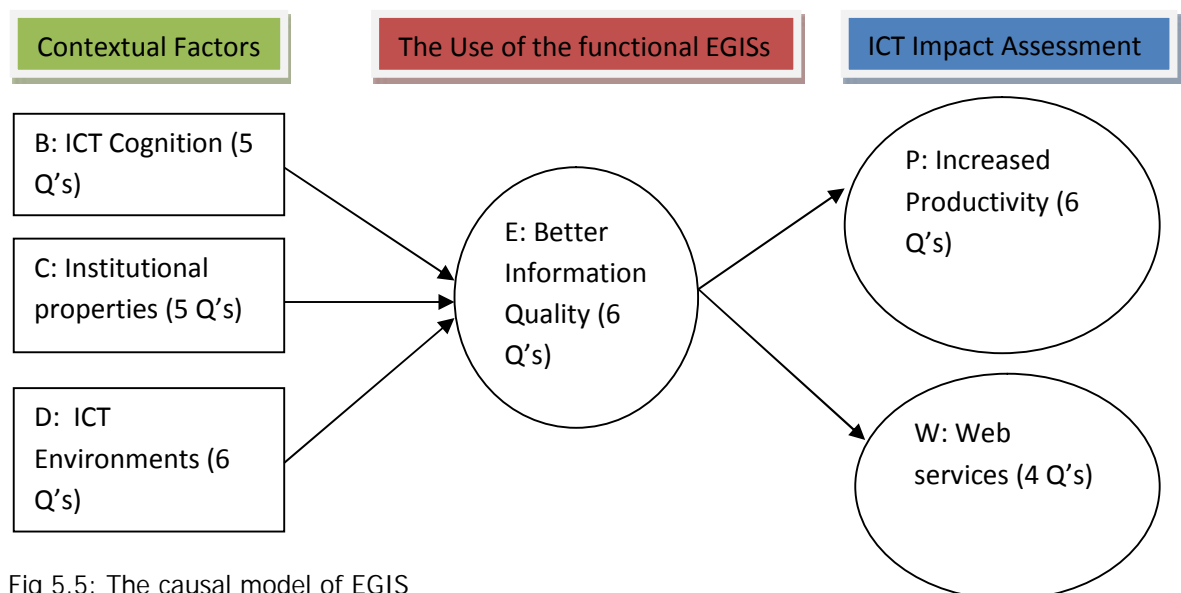


Fig 5.5: The causal model of EGIS

5.3.0: Data Analysis and Interpretation

Data collected and subsequently cleansed, revealed several claimed facts when analysed. Below is a series of analysis and interpretations by the author concerning the quantitative part of the data collected. Question 4.4.1.1 was answered by inspecting frequencies generated from responses to section A of the questionnaire as noted earlier.

5.3.1: The Dropped Items

The focus is first on analysing why the four items were dropped from the proposed factor model. Dropping items, however, should be clarified to the reader; it simply means that the item under the proposed factor does not load or represent that factor itself and does not necessarily mean that the item is eliminated from the questionnaire due to a fault in the content. The dropped items from the model are listed below with their proposed factors:

1. ICT cognition (B4): I think ICT can decrease bureaucracy
2. Institutional properties (C5): Our organisation evaluated the ICT applications that we work with regularly
3. Service delivery (F1): After deploying ICTs at work, our transparency had improved
4. Better functioning (G7): I believe ICT has reduced my overall work load

Analysing each item by itself:

1. Looking at the ICT cognition factor: item (B4) I think ICT can decrease bureaucracy

It seems that employees could not connect to their ICT cognition, the ICT possible impact towards bureaucracy, fulfilment on the job, and social development. Even though the later two were not dropped but their loading onto the ICT cognition factor was lower than the first three items B1-B2-B3.

This could be simply due to the fact that ICT impact on these factors (B4-B5-B6) will only appear after a period of time has elapsed (Herindranath and Sein 2007) and only then, the effect of social development and reduction of bureaucracy can be felt or even adopted by the employees themselves. When the two are achieved, maybe then employees can feel the power of ICT in changing the status quo and hence would feel fulfilment from implementing such technologies. Since the project's speed and application usage was still at an early stage, those three items did not load on cognition as such. If the reader looks back on the Eigenvalues from the EFA, it is obvious that the two items fulfilment and social development hung together and not under ICT cognition. ICT cognition, to the employees, was more concerned with the individual's likeness towards ICT artefact in its micro level and it seems employees were not able to identify with the macro level of ICT cognition items represented by B4-B5-B6.

It is worth mentioning, however, that 59.3% of employees' opinion varied between agree and strongly agree in regard to ICT fostering bureaucracy as presented in table 5.11 and figure 5.6 below:

B4: I think ICT can decrease bureaucracy

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 16 | 4.8 | 4.9 | 4.9 |
| | DISAGREE | 46 | 13.9 | 14.0 | 18.8 |
| | UNDECIDED | 72 | 21.7 | 21.9 | 40.7 |
| | AGREE | 126 | 38.0 | 38.3 | 79.0 |
| | STRONGLY AGREE | 69 | 20.8 | 21.0 | 100.0 |
| | Total | 329 | 99.1 | 100.0 | |
| Missing | System | 3 | .9 | | |
| Total | | 332 | 100.0 | | |

Table 5.11: Frequency of respondents to B4

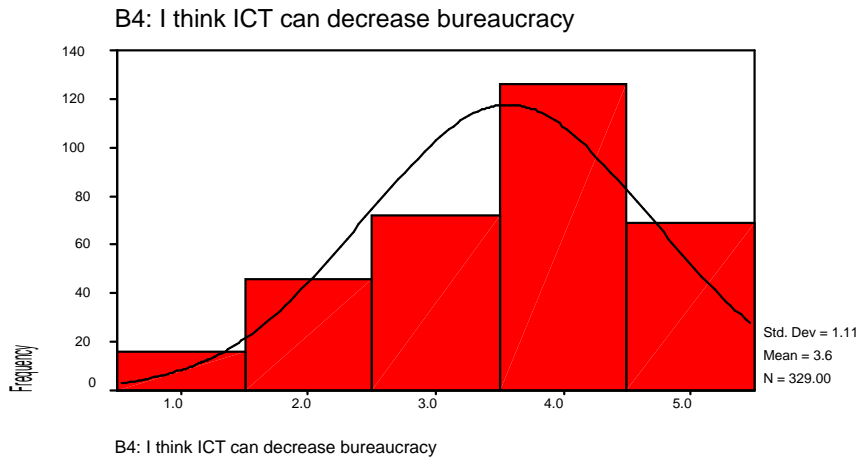


Fig 5.6: Graphical representation of employees' response to item B4

2. Concerning the institutional property factor: item (C5) Our organisation evaluated the ICT applications that we work with regularly

Item C5, surprisingly, did not load with the institutional property factor. The item itself is concerned with management evaluating software produced and this might seem to be at a disconnect with the employees themselves. In other words, it could be that the employees saw no relation to themselves with the item itself, but rather it was an administrative matter. Table 5.12 and figure 5.7 illustrate the answers provided to that item.

C5: Our organization evaluates the ICT applications that we work with regularly

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 38 | 11.4 | 11.5 | 11.5 |
| | DISAGREE | 93 | 28.0 | 28.2 | 39.7 |
| | UNDECIDED | 91 | 27.4 | 27.6 | 67.3 |
| | AGREE | 92 | 27.7 | 27.9 | 95.2 |
| | STRONGLY AGREE | 16 | 4.8 | 4.8 | 100.0 |
| Total | | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

Table 5.12: Responses to the dropped item from the model C5

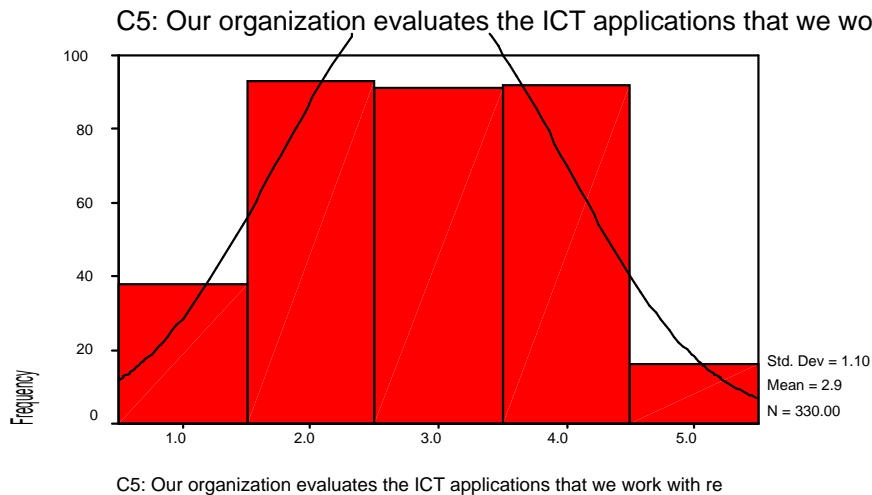


Fig 5.7: Graphical representation of employees' responses to item C5

It is obvious, however, from the graphical representation that the majority of the employees (67.3%) are either undecided about this item or, generally speaking, disagree with it.

3. In regards to service delivery factor: item (F1) After deploying ICTs at work, our transparency had improved

Transparency organisations put Lebanon in the bottom 50 of the 180 countries listed. In 2007 and 2008 the CPI (Corruption Perception Index) was 3/10; in 2009 and 2010 it went down to 2.5/10 (Transparency International website). Lebanon's corruption has been entrenched in the system for centuries. This is evident in the information given on Transparency International website regarding Lebanon, where it states:

'In 2009, Lebanon received a score of 2.5 out of 10 on the Corruption Perceptions Index (CPI). Over the years, Lebanon's steadily low CPI scores stems from the country's deadlock due to the political crisis extending over the past two years. Moreover, given the confessional nature of the Lebanese political system, corruption has been

institutionalised, especially when religious bodies or sects serve as mediator between the citizens and the state’.

The grim fact presented above, casted doubt on the F1 item and on the ability to reduce the entrenched corruption by any means, let alone by ICT artefacts. The reader must bear in mind that the validity of the item itself is not in question, but rather the connection between the item and the ‘service delivery factor’, which was consequently dropped. In other words, citizens’ services delivery is arguably not seen as a public servants’ job. It is no wonder that the proposed factor was totally dropped from the output of the model.

Therefore, transparency per se is not considered a duty or a service to be offered and hence, the item did not register as it was intended to.

4. As for the functioning factor: item (G7) I believe ICT has reduced my overall work load

The item related ICT with work load weight and it seems not to load on the increased productivity and the speed of productivity at work. Despite the non-loading fact, the item gave some kind of authenticity to factor analysis technique in showing that items that don’t relate as much to the core or factor that all the items describe, will get dropped. It is surprising, though, to see that 55.4% are either undecided or believe that ICT did not reduce their workload. Consequently, this is the answer to the question posed in 4.4.1.3 in section 5.0. The probable explanation to this is basically by understanding that the administration was still conducting parallel manual work to the automated ones. That in turn, registers with employees as more of the same stuff and sometimes even more work. The concept was not rare

or confined to developing economies; this was also viewed and proved to be the case in industrialised countries as the case of the Australian case in the literature review (O'Donnell et al. 1999).

5.4.0: Conclusion

Chapter five has thoroughly analysed and discussed the quantitative data collection. It started by giving the demographics and a general description of the respondents and moved on validating their answers by applying statistical technique in order to remove vague questions posed in the questionnaire. Additional statistical modulus operandi in the form of factor analysis was applied to determine the number and nature of the variables among the large numbers of measures obtained from the questionnaire. It went further and discussed the fine tuning of the proposed model after dropping some elements describing the reasons behind that. Figure 5.5 presented the new obtained model and summed up the changes to the model suggested after the analyses were conducted. This further enhances the reader's understanding on how the study tried to analyse the quantitative phase. The next chapter shows extensive analysis of the refined framework and try to answer the remaining proposals.

CHAPTER SIX

ADDRESSING THE PROPOSITIONS AND DISCUSSING THE FINDINGS

6.0: Introduction

This chapter discusses the many findings presented in both chapter four and five. In sections 6.1.0 through 6.5.0, the study looks at the subject matter from a macro perspective and links the findings with the original objectives, questions posed, and propositions originally set by the study. Furthermore, it tries to compare and contrast the findings with previous work conducted in related ICT impact studies.

6.1.0: Trajectory Mapping of the E-Gov Effort

The research site has not been researched previously as Lebanese officials proclaimed. The political and administrative wrangling was, at times, at its peak with respect to ownership of the advancement process, accepting or rejecting international bodies to be admitted to such efforts, and the intention sought behind the ICT effort.

During the course of this study, it was obvious to the researcher that a group, who felt that the country is being run by outsiders through ICT enabled systems, or being, as Ciborra (2005) put it 'governed at a distance', did not reject the automation process per se, but was concerned with information security. The group not only abhorred the system and the people running it, but worked on sabotaging the efforts by the opposing group. Several interviewees mentioned incidents where eavesdropping was investigated, but investigations were halted by some high ranking elements

in the administration. This was viewed as a particular contingency for the study at hand.

To understand the hindrances of this project, vis a vis all the above mentioned wrangling, and to put it into perspective in order for the reader and the researchers to understand why things took a certain course of action, a complete and holistic investigation was sought. The snap shot investigation would provide a still frame or image of the situation (Azad and Faraj 2008) which is contrary to the fluid place accented by an ICT project. The search was for a framework that can expand and collapse based on the situation at hand (Evans and yen 2005). Trajectory mapping depicted for the study, helped in enlisting previous work and efforts towards building an EGIS from inception to the date the research was conducted. The interviewees gave stories of evolution by different accounts depending on the interviewee's point of view or perspective. The trajectory mapping was an enabler to draw the genealogy of the EGIS graphically and took into account the different viewpoints and the power that enable each view point to be a reality. This sequence of events in real time was obvious when plotted on the graph.

A researcher would arguably benefit from the sequence of events and can refer to the time when the incident or event happened. Using this method in this research enhanced the analysis of data and made clear explanations of each and every data represented in the findings. Yet, the proposed impact can only be assessed, this research argues, through an objective thorough investigation of users and beneficiaries. This may only be accomplished by a holistic study. The call for a holistic view of e-Gov or EGIS work has been heard from Walsham (1998) and Orlikowski and Iacono (2001).

This research was concerned with the macro level view from inception to delivery of the EGIS in the Lebanese MoF. Trajectory mapping was found to be a building block (a crucial tool or aid) to expose the local and relative contextual factors in the research sites. Knowing the proper factors allowed for a better design of the questionnaire and it became obvious that knowing these factors beforehand reduced the size of the research instrument used and directed the analysis process to the actual factors in the research site.

Hence, trajectory mapping allowed for the proper study of the case longitudinally and exposed all the working programs that could produce impact, therefore, directed the researcher's efforts towards the proper area. In this regard, trajectory mapping sought benefits projected by proposition I and II were found to be satisfied.

6.2.0: Analysis of the Local Contextual Factors

The qualitative efforts paved the way to the understanding of what factors come into play when trying to work with information and information systems in the Lebanese context. From the interviews, a fair idea was obtained about several aspects of the MoF such as: data transmission, computer equipment, level of employees' computer knowledge, and training offered. That, in turn, allowed for the formation of a proper model to fit the situation at hand. Conducting factor analysis reduced and enhanced the viability of the model by using this kind of multivariate analysis. A factor by factor discussion is conducted below to try to understand the local contextual factors involved.

Contextual factor B (ICT cognition) and C (institutional properties) were somehow interrelated. The logic goes that when the company trains its employees on computer affairs, then their ICT cognition will increase. Statistics were used to obtain more answers from the data about these factors. Univariate analysis was used to analyse responses to factor B. Frequencies presented in Appendix SPSS-1 show that the majority of employees were eager to work with technology. The researcher used cross tabulation to ascertain if age or gender had any effect on this use, and found that no matter what the age or the gender was, the eagerness to use technology was spread across the spectrum.

Univariate analysis was also used to obtain and answer Question 4.4.1.2, which dealt with training and whether it prepared employees for the task at hand. Inspecting the frequencies of items related to the C factor (refer to SPSS-1 output); the reader can notice that employees have a perceived belief that management thinks training is necessary. However, training programs offered seemed inadequate enough (apparent from the indecisive respond to C2-C3, received about 40 to 50% acceptance). Regarding the follow up required to the training delivered and the support activities that go along with it, employees were adamantly negating the governments' stance (C4-C5-C6 rejection rate ranged from 67.3% to 81.3%). To summarise the C-factor response findings: training was offered to employees at the start of their employment, but negligible follow up or re-training was offered or perceived as adequate by the respondents.

Concerning the third contextual factor proposed, all items corresponding to factor D (ITC environments) loaded perfectly. This was seen as a surprise in a country where electricity is irregular, to say the least, and basic electronic

infrastructure is not fully in shape (all connection lines are still made of copper and efforts to transform to fibre optics has barely just begun). The fact that all factors loaded on D with D2 the highest (I am satisfied with the system's ease of use) confirms that the hardware is intact and the employees are satisfied with the computer equipment they have. Having the system always ready and available improves the chances of using the software all the time during work.

6.2.1: Regression Analysis

The three contextual factors were proposed to have a direct effect on the quality of the software produced. This was the explanation of the model proposed by Orlikowski in 1992 and known as the Orlikowski Model of Technology. Confirming this relationship and to find the weight of each of the contextual factors on the produced software quality factor required the use of multivariate analysis in the form of regression. The idea was to perform regression analysis on the items that loaded on each of the contextual factors, with the mediating factor E. By doing regression, coefficients of the factors were obtained and this in turn exposed statistically the contribution of each of these factors on the mediating variable E in a form of a linear equation. Then, the coefficients' weights were compared to the frequencies obtained to check the viability of the obtained values.

For that endeavour, SPSS was used again to conduct regression analysis and the results obtained (refer to SPSS-10) showed the following equation:

$$E = 0.159 * B + 0.371 * C + 0.478 * D + \text{error}$$

Which corresponds to:

$$\text{Software Quality} = .159 (\text{ICT cognition}) + .371 (\text{Institutional Properties}) + .478 (\text{ICT environments}) + \text{error}$$

The result obtained, from the regression performed, asserts the findings in the analysis of frequencies above. The expected ICT environments (D) received the biggest coefficient matching the frequency of the respondents and their acceptance of the fact that their computer hardware performance is adequate. The C factor shows that the training for the job was conducted properly but that it did not expand to improve the employees' ICT cognition (B). Again, this affirms the analysis conducted before regarding the factors B and C. The results showed also that the Orlikowski Model of Technology checked out in the Lebanese situation and is valid statistically.

The regression results could also explain some of ANT logic and shed a light on what the government is doing and what it is lacking. ICT cognition and institutional properties are considered the 'human' side of the man-machine argument, while ICT environments are considered the machine side. The researcher suggests, from looking at the coefficients obtained, that the government brought in the right machines, yet what was lacking was rather on the human side in regards to training and improving the ICT cognition. The essence of the Socio-Technical theory, crudely explained, is when the social (human) and technical (machine) mesh tightly, and then the produced product is considered as good. Lacking on the social side by the government reduced the quality of the software and this is where the efforts must be concentrated to enhance the situation.

6.3.0: Addressing the Propositions (III – VII)

The three sought-after factors that the study was looking to ascertain are mentioned in section B in the subsection 3.2.2 and they simply require an objective assessment.

6.3.1: Proposition III, ICT improved information quality

Information quality was assessed by the proposed factor (E), on the questionnaire, by using 6 items. Factor analysis technique substantiated the items used as they all loaded on the factor, with E2 (I believe ICT provided me with information that is accurate) receiving the highest load (refer to Appendix SPSS-7). Items related to ICT improving work such as E1-E2 and E3 received a very high agree and strongly agree frequency among the respondents. This in turn, allows for the belief that the automation aspect of the ICT artefact was vividly appreciated. Yet, the perception of employees towards the IT unit and its workers seem to be muted or not understood. This shows a lack of interaction between business knowledge workers and the IT unit personnel responsible for automating the knowledge workers' job. A good understanding and relationship with the software users is crucial in the SDLC cycle to tailor the IT artefact to the needs of the public servants (Haag et al. 2006). From E4, E5 and E6 (I believe our IT personnel understand our business functions; I believe our IT personnel understand the organisation's policies and laws; and, I believe our IT personnel are free to assist users when needed, respectively) 58% replied undecided or negatively on E4; while 59.7% and 53.6% did the same for E5 and E6. In other words, there exists a contradiction to the belief that a good solution exists when the business and IT side agree on a good working relation, usually called the Service Level Agreement (SLA) (Haag et al. 2006).

In pure statistical analysis, this would make no sense. How can the first three items of software quality be positively answered while a crucial element of securing a workable software (i.e.: IT personnel and knowledge workers' interaction) was not present? According to Haag et al. (2006), without that type of interaction, the software or any IT artefact is doomed. The answer was obtained from the previous effort conducted by the researcher where the interviewees admitted that the IT workers did the job of the knowledge worker in tax administration duties when the latter were not hired yet. That in turn, gave the IT personnel the necessary means and knowledge of what is needed in almost every job on the floor of the revenue department. This claimed fact was not common knowledge to employees, and hence, their negative responses to the E4-E6 items. To summarise, proposition III was statistically proven as positive by the research instrument used.

6.3.2: Propositions IV and V: ICT improved service delivery to citizens and ICT had a positive impact on the functioning of the Lebanese MoF

Factor analysis eliminated a proposed factor (service delivery) and produced loadings of items on new undesignated output factor. The speeding up of the work process was viewed as one important factor that ICT artefacts were able to realize. Increasing public participation item by ICTs (F2 on the questionnaire) registered 46% of respondents either undecided or disagreeing with the statement. The loading was also of the least value compared to the other items who loaded with G2 (I believe ICT enabled me to do my job quickly) as the highest load.

Therefore, one of the output factors generated by factor analysis was an expected factor, productivity (denoted by P hereafter) which took over items that were proposed to be under 'service delivery'. The highest loading item (G2) represented the factor and received 77% responses between agree and strongly agree. This shows that the automation was viewed by employees as beneficial for their work.

In addition, a new unpredicted second output factor emerged named 'Web services', or (W) for short. The name was given, pertaining to literature from factor analysis, since the loaded items loaded onto W3 (The web information reduced my work as a tax advisor) as the highest load value. Table 6.1 shows the new P and W factors and their corresponding loads. Whereas ICT artefacts produced, dealt with work process automating applications that included web services to automate processing applications by the end users (citizens) directly; public servants distinguished between the two. Citizens' service delivery did not register even as an issue. In contrast to developed countries where, as Vasconcellos and Rua (2005, P 50) noted:

'Citizens and companies have started becoming the focus for Tax Administrations in many nations around the world, increasingly perceived as "clients" of the government – in the style of total-quality programs'.

It could be argued that in Lebanon citizens are not viewed as customers yet, and the notion of service delivery could be for some time off. Furthermore, the perceived impact of web services was not felt by the public servants. Some employees perceived the MoF webpage as of value (W1 received 61.9% agreeable responses), yet the supposed services concerning reduction of interaction (W2), reduction of their work as tax advisors (W3), and as a good taxpayer teaching tool (W4), were not supported by the

majority of employees. 64%, 70.2%, and 59.2% of respondents were either undecided or with negative responses to items W2, W3, and W4, respectively. Tables 6.1 through 6.5 and figures 6.1 through 6.4 illustrate the described responses.

To summarise, answering propositions IV; ICT statistically did not improve service delivery to citizens, while support for proposition V received a split vote between a 'yes' on automating their function process and 'negative' on the web services intended to ease work on employees in the Ministry.

| Rotated Component Matrix(a) | | | |
|---|------------------|----------|----------|
| | Component | | |
| | 1 | 2 | 3 |
| E1: I believe using ICT provided me with information that is useful | .795 | | |
| E2: I believe using ICT provided me with information that is accurate | .814 | | |
| E3: I believe using ICT provided me with information at the right time | .779 | | |
| E4: I believe our IT personnel understand our business functions | .625 | | |
| E5: I believe our IT personnel understand the organisation's policies and laws | .613 | | |
| E6: I believe our IT personnel are free to assist users when needed | .619 | | |
| P1: After deploying ICTs at work, we can increase public participation | | .433 | |
| P2: After deploying ICTs at work, we can service customers much faster | | .762 | |
| P3: I believe ICT increased job productivity | | .766 | |
| P4: I believe ICT improved my judgment at work | | .678 | |
| P5: I believe ICT enabled me to do my job more quickly. | | .777 | |
| P6: After deploying ICTs at work, we can deliver tailored services to citizens | | .774 | |
| W1: The Ministry of Finance's website has good information about all tax procedures | | | .547 |
| W2: I believe ICT reduced our interaction with citizens due to the web offered services | | | .775 |
| W3: The web information reduced my work as a tax advisor | | | .864 |
| W4: Putting all the tax material on the web was a good taxpayer teaching tool | | | .800 |
| Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. | | | |
| a Rotation converged in 6 iterations. | | | |

Table 6.1: Loading for the mediating and output factors

W1: The Ministry of Finance's website has good information about all tax procedures

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 33 | 9.9 | 10.1 | 12.8 |
| | UNDECIDED | 83 | 25.0 | 25.3 | 38.1 |
| | AGREE | 163 | 49.1 | 49.7 | 87.8 |
| | STRONGLY AGREE | 40 | 12.0 | 12.2 | 100.0 |
| | Total | 328 | 98.8 | 100.0 | |
| Missing | System | 4 | 1.2 | | |
| Total | | 332 | 100.0 | | |

Table 6.2

W2: I believe ICT reduced our interaction with citizens due to the web offered services

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 34 | 10.2 | 10.4 | 10.4 |
| | DISAGREE | 79 | 23.8 | 24.1 | 34.5 |
| | UNDECIDED | 100 | 30.1 | 30.5 | 64.9 |
| | AGREE | 96 | 28.9 | 29.3 | 94.2 |
| | STRONGLY AGREE | 19 | 5.7 | 5.8 | 100.0 |
| | Total | 328 | 98.8 | 100.0 | |
| Missing | System | 4 | 1.2 | | |
| Total | | 332 | 100.0 | | |

Table 6.3

W3: The web information reduced my work as a tax advisor

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 46 | 13.9 | 14.0 | 14.0 |
| | DISAGREE | 81 | 24.4 | 24.6 | 38.6 |
| | UNDECIDED | 104 | 31.3 | 31.6 | 70.2 |
| | AGREE | 83 | 25.0 | 25.2 | 95.4 |
| | STRONGLY AGREE | 15 | 4.5 | 4.6 | 100.0 |
| | Total | 329 | 99.1 | 100.0 | |
| Missing | System | 3 | .9 | | |
| Total | | 332 | 100.0 | | |

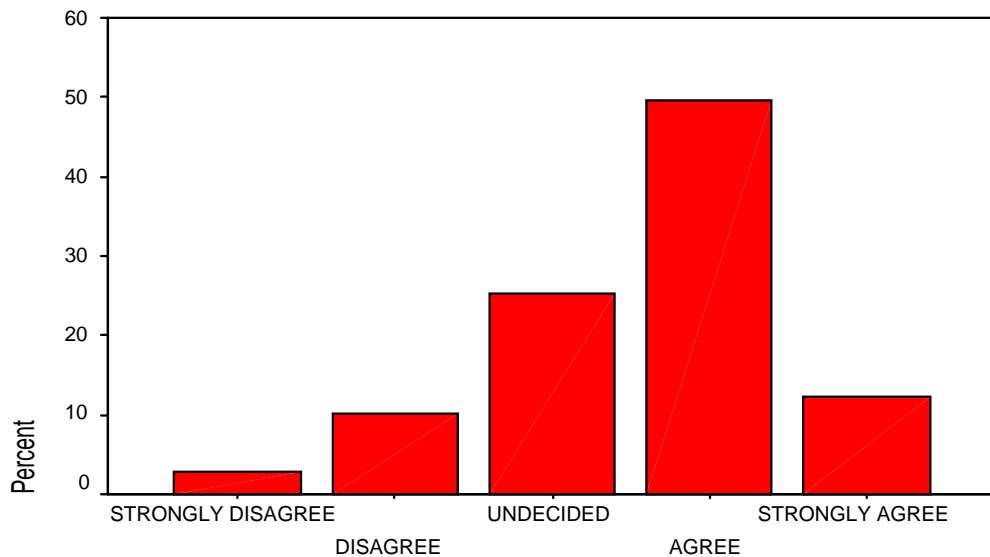
Table 6.4

W4: Putting all the tax material on the web was a good taxpayer teaching tool

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 22 | 6.6 | 6.6 | 6.6 |
| | DISAGREE | 61 | 18.4 | 18.4 | 25.1 |
| | UNDECIDED | 113 | 34.0 | 34.1 | 59.2 |
| | AGREE | 113 | 34.0 | 34.1 | 93.4 |
| | STRONGLY AGREE | 22 | 6.6 | 6.6 | 100.0 |
| | Total | | 331 | 99.7 | 100.0 |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

Table 6.5

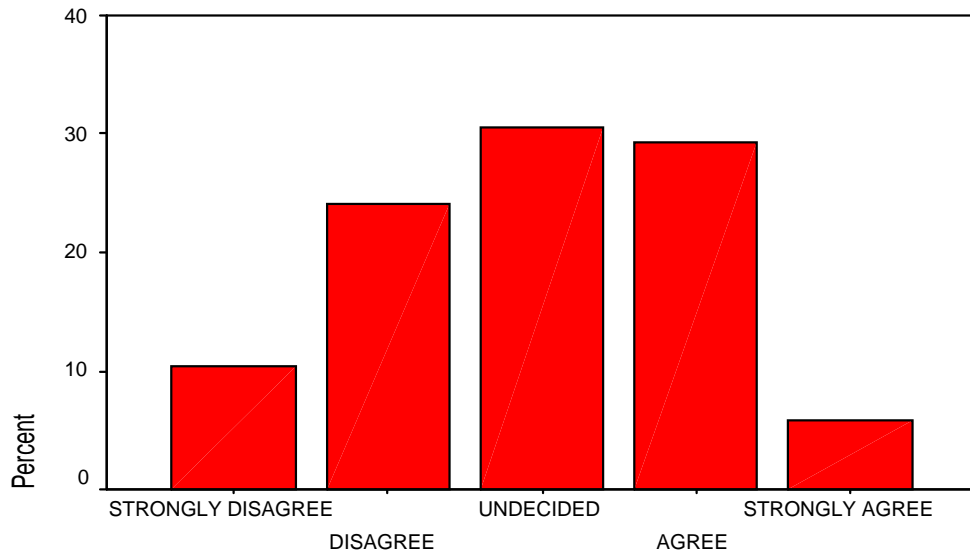
W1: The Ministry of Finance's website has good informat



W1: The Ministry of Finance's website has good information about all tax

Fig 6.1

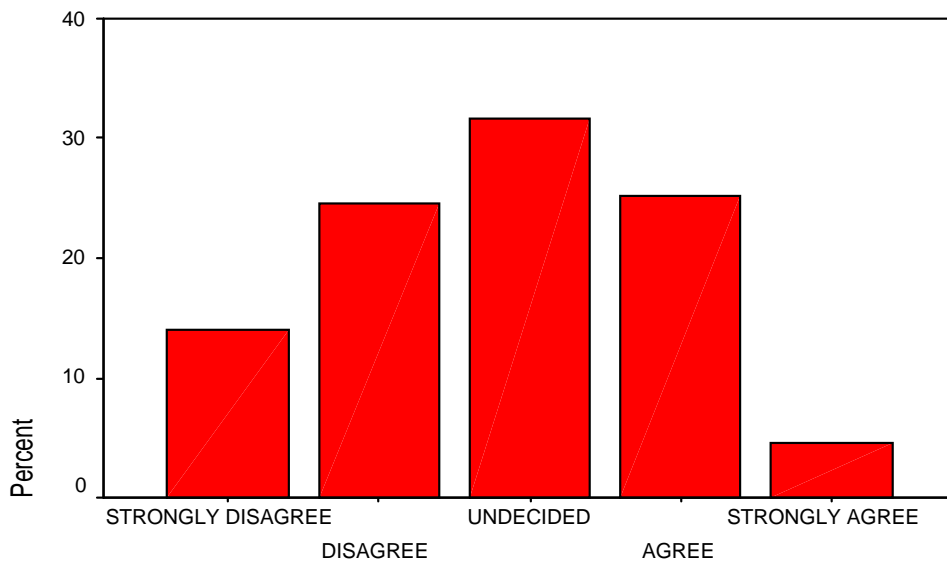
W2: I believe ICT reduced our interaction with citizens d



W2: I believe ICT reduced our interaction with citizens due to the web o

Fig 6.2

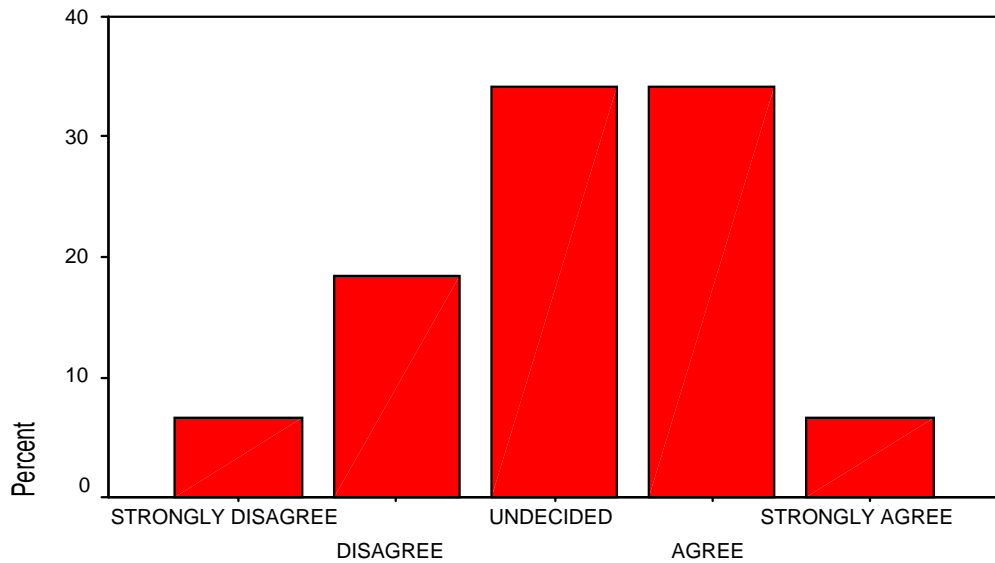
W3: The web information reduced my work as a tax ac



W3: The web information reduced my work as a tax advisor

Fig 6.3

W4: Putting all the tax material on the web was a good taxpayer teaching



W4: Putting all the tax material on the web was a good taxpayer teaching

Fig 6.4

6.3.3: Proposition VI - ICT Improved Revenue Generation at MoF

Proposition VI required secondary data collection from the MoF and other international bodies, such as the International Monetary Fund (IMF). Data was retrieved from the MoF's annual reports from 1998 to 2009. The column depicting tax revenue generation was moved to an excel workbook sheet. This process gave a ball park figure of tax generated for each year but was found deceiving since the tax was not in a ratio compared to the GDP of each particular year. Hence, data from the IMF was needed for the Lebanese annual GDP for the targeted years. The provided data from IMF, however, was in US currency which was then converted to Lebanese pounds (LBP) and inserted in the excel work sheet. Then a column on the workbook was created to calculate the percentage tax to GDP by dividing the two figures. All raw and calculated data are presented in table 6.6 with important dates marked that were deemed important for analysis purposes.

| Indicator | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| GDP (US\$) | \$17,108,967,140 | \$17,031,450,813 | \$17,260,364,842 | \$17,942,756,150 | \$18,548,122,592 | \$19,148,597,728 |
| GDP (LBP) | 2.51212E+13 | 2.50074E+13 | 2.53435E+13 | 2.63455E+13 | 2.72343E+13 | 2.8116E+13 |
| ttd tax revenue | 3,097,185 | 3,321,061 | 2,938,014 | 2,962,770 | 3,995,251 | 4,501,871 |
| % of GDP | 12.3 | 13.3 | 11.6 | 11.2 | 14.7 | 16.0 |

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| GDP (US\$) | \$20,580,683,499 | \$20,785,852,359 | \$20,908,921,500 | \$22,474,236,216 | \$24,570,215,379 | \$26,535,832,609 |
| GDP (LBP) | 3.02188E+13 | 3.052E+13 | 3.07007E+13 | 3.29991E+13 | 3.60766E+13 | 3.89627E+13 |
| ttd tax revenue | 5,168,747 | 4,866,834 | 4,942,774 | 5,582,892 | 7,182,442 | 8,967,305 |
| % of GDP | 17.1 | 15.9 | 16.1 | 16.9 | 19.9 | 23.0 |

HARIRI DEATH ISRAELI WAR

Table 6.6: The trend of taxes collected as a percentage of the GDP (sources: MoF and IMF websites)

Inspecting the table, a fast conclusion can be drawn. Tax revenues did grow when there was political stability in the country. A dip in the tax revenues was obvious in year 2000 (from 13.3% to 11.6%) but this could be attributed to PM Hariri leaving office at that time which prompted some companies to leave Lebanon fearing unrest. A sharp increase can be witnessed in 2002, yet this is explained clearly by the introduction of VAT and not due to any claimed ICT-impacted tax enhancements. The dip in the years 2005 through 2007 was due to several political incidents; namely: death of PM Hariri in 2005, the Israeli-Lebanese war of 2006, and the aftermath of the war in 2007. The years 2008 and 2009 witnessed a big tax revenue generation, but similarly, the stability in the country and the influx of tourists and expatriates, could be the reason behind the increase and again not due to ICT intervention.

Hence, proposition VI, could not be substantiated from statistics gathered and the answer to the proposition from this effort could be rendered as inconclusive.

6.3.4: Proposition VII- The Level of Success Given by Trajectory Mapping Technique has a Direct Causal Effect on the Impact of an EGIS

Proposition VII posed the question: Is the final node on the trajectory graph presented, representative of the situation? The description given by ANT literature is as follows: if the node ends up in the positive quadrant, then the project is solid and indispensable (Law and Callon 1992). Statistics, however in the Lebanese case at least, showed that this is not entirely true. The project is ongoing, did succeed in some aspects (automation), but failed in other aspects too (web services). The researcher's belief is that it all depends on many factors that range from training, to internet penetration, to internet infrastructure, to culture, to security, and to the education of

citizens on how to seek benefits from such services. In other words, the notion of positive quadrant to mean a very successful project was not supported by the statistics conducted and hence, could be rendered inconclusive.

6.4.0: The Quantitative Conclusion

To sum it all up, statistically speaking, as for ICT improving revenue generation, this study was not able to gauge that from the secondary data obtained due to several factors, one of which is the political instability of the country. Some other conclusions could be listed as follows:

- The government conducted a satisfactory 'for the job' training but did not venture in developing employees. Therefore, their ICT cognition is not up to standards.
- The hardware equipment and infrastructure provided to the Ministry was adequate to do the job.
- ICT improved information quality was provided to public workers, yet the dedicated efforts by the IT unit in creating the software were not acknowledged.
- Service delivery to citizens, not surprisingly for a developing economy nation, was not viewed as a necessary service.
- Finally, ICT artefacts which, in the Lebanese case, can be split into two services (automation and web services) scored positive for automation and negative for web services.

6.5.0: The Holistic View of the Conceptualisation of ICT Impact

The study's findings could be related to many different areas in the conceptualisation of technology investigations. However, most articles reviewed in chapter two of this thesis were either pre-implementation (Velsen et al. 2009; Heeks and Stanforth 2007; Koh et al. 2008) or post

implementation (Gupta and Jana 2003; Evans and Yen 2005; Tseng 2008) of an ICT enabled system. Others were hypothetical or philosophical in improving the impact by creating models (Layne and Lee 2001; Wang and Liao 2008) with some using case studies as supportive means. The holistic view was rare in the literature reviewed. In the following sub-sections the 'holistic view' is discussed extensively.

6.5.1: Holistic View Requires Multi-Theory and Multi-Methodology

After a search and review of literature on impact studies on financial institutions using suitable theoretical frameworks, related efforts to this research were depicted, most notably the work of Heeks and Stanforth (2007) and Tseng (2008). Both articles showed work conducted on e-Gov projects, related to finance Ministries in different parts of the world (Sri Lanka and Taiwan, respectively). Their work was crucial in providing the author with a solid source of information relating to the methods used in investigating ICT impacts on finances. This in turn, has made its implications on whether to use a similar approach for the research. Furthermore, thorough investigation of the works, by the author, showed that each article was addressing a different period or stage of a similar e-Gov project. Heeks and Stanforth's work concentrated on the design of the e-Gov effort from inception to the time of the study. They methodologically used the global and local construct of ANT to try to show its applicability in such an endeavour and were able to come up with conclusions and recommendations for future use of such framework. However, the biggest drawback in their work was the notion that the implementation was never carried out during their investigation at least, and conclusions drawn based on design ideas are arguably not very precise.

Tseng, on the other hand, was more concerned with a period after the EGIS has been deployed and its impact. Yet Tseng did not use any trajectory mapping of the EGIS beforehand, hence, proposed two extra contextual factors to the ones proposed by Orlikowski's Model of Technology (based on Giddens's Structuration theory) and subsequently were dropped. His final result was exactly the model of technology. Had Tseng conducted a mapping of the stages of the design process, he arguably could have had the proper factors to propose based on information provided from a qualitative would be part.

The two efforts combined were seen, by the author, to provide an overall view to the technology conceptualisation. Potentially, studying the combination of these efforts would be considered somehow a holistic project's study and may examine several research issues not addressed before. This required that further studies should be made around the idea of the combination by using appropriate techniques. Therefore, the author in this research tried to provide researchers with a comprehensive framework which is based on multi-theory usage and the adoption of multi or nested methodology at different stages of the project to ascertain ICT impact studies, holistically.

This effort supported empirically the three-layered model by Omoteso et al. (2007) where they suggested phases in the research with different theories to guide the researcher throughout each phase. During this research, it can be argued that the first phase was leaning towards a purely qualitative research that warranted a suitable theory for that stage. The depicted ANT constructs proved to be a guide to the researcher through the process of qualitative data collection. Whereas, the quantitative phase required

empirical models and structuration theory was found to be a more comprehensive guiding theory through the quantitative data collection. It was seen that combining methodologies proved to be fruitful in complementing each other rather than contradicting each other, and hence gave a clearer picture of the situation at hand. The triangulation of sources used allowed for checking the authenticity of each of the methods used during the two stages of the project.

6.5.2: Social or Technical Determinism?

Both determinisms (social and technical) were felt during the course of the study. When the project was halted back in 2000, social determinism was vivid since the stoppage was politically mandated. By the same token, the minister was forced to reconsider his decision at a later stage due to the dire need of work automation; that was a sign of technology determinism. Therefore, in studying the evolution of the EGIS from inception to after implementation proved that aligning one-self to either one of the schools is misleading. It was obvious that when the socio-technical became solid, then the project translated smoothly. But when one element of the man machine networks crumbled the socio-technical bond seemed to loosen and the project slowed down accordingly. In a complex situation such as a wide scale information technology adoption as in the case of an e-Gov application, factors may vary a lot and more caution must be given to drawing conclusions from a single or micro incident.

These findings were in staunch contrast with Heeks and Stanforth's (2007) findings, where, in their conclusion of the work they conducted, the following statement was uttered:

'We can see this actor-network approach as a strong rebuff to technological determinism. The technology does not determine the trajectory and outcome' (p. 174)

despite their assertiveness that their work has been limited:

'Indeed, in this particular case, there has been relatively limited emphasis on technology because planning rather than implementation of the central e-Gov application (IFMIS) was the focal activity during the time period under study' (P. 174)

In other words, despite the lack of implementation of the project, Heeks and Stanforth re-iterated their stance about their findings of rejecting technology determinism by stating that:

'A counter blast against technological determinism has been commonplace to the point of tedium in IS research conclusion for at least the past thirty years' (p. 174)

A study conducted only on the planning stage might have casted these beliefs on the conclusion of their work. The belief of the author is that if Heeks and Stanforth had witnessed the implementation of the proposed trajectory mapped; things could have been interpreted differently.

6.5.3: Suitability of ANT throughout the First Phase

Another aspect in the selection ANT, this study claims, is its refusal to distinguish a 'piori' between humans and non-humans, or priori between small and big networks (Monteiro 2000). ANT helped in unpacking the socio-technical process that was unfolding over time at the Ministry. This eventually constructed reality and order in this longitudinal study. The formation, the disintegration and the re-formation of the different networks

were conceptualised by the theory. It was more like guidance throughout this phase of the research. When, somehow, a strong relationship existed between a stable local network's and a similarly stable global network during a certain period, then work was shown to run smoothly even with the constant presence of rejectionists in high posts. Furthermore, despite those high ranking officials' objections, the IT unit (the software producer) was an obligatory point of passage for almost all stakeholders (only the staff who decided to stay manual).

ANT prescribes also to translation of interests in its four moments of translation construct as explained in chapter two of this thesis. This construct however, assumes static relationships between man and machine and between interests in the networks. In this study however, the e-project and the networks' wrangling in each network and among networks was everlasting as it was obvious in the case study at hand. Even when the work flow was being automated, translation of interests and irreversibility were not so static per se. ANT proposes that translation to interests would lead to a stable network. However, it was arguably clear that this translation requires time and when it happens it happens in stages. For example, major rejection to computers was seen at the first induction of the machine in the Ministry, yet with time that rejection became less obvious and the 'monster' was used as a gaming platform before it became an enabler of faster and more precise work.

In other words, if a person were to look at the automation effort at the end of 1998, it would be obvious to them that the effort was a complete failure since irreversibility (using computers to conduct work) did not stick. Therefore, it is arguable that translation, though explains how interests of

actors are aligned, does not account for a sudden change in power in the different networks and consequently affects the translation construct, who the author view as being static in nature and not conforming with an e-Gov project which is marked with turbulent and un-expected incidents.

Critique to the use of ANT, however, should also be presented. The theory adheres to narrations by the actors but it does not prescribe for a particular qualitative method of analysis. It was found by this study that discourse analysis could have been a proper analysis technique to understand the intended meaning of some of the statements by officials. Some hidden meanings, arguably, could have only been clarified by looking at the facial expressions of the interviewees when they were uttering the words. This was deemed necessary in making the meanings clearer. It was those particular hidden meanings that could have explained the behaviour of the actors at certain periods. For that reason many quotations were taken from the interviewees and referred to in the sub-sections mentioned above.

ANT, and opposite to the interpretivists understanding (Cordella and Sheikh 2003) who use ANT as a lens to convey their own constructed reality, has its own ontology where the reality 'emerges-out' from the interplay between actors and the wrangling of networks (Rawas 2010). The claimed truth/s or 'reality' about the success of the e-Gov efforts, however, could not be objectively gauged, it was dependent on which network actors were investigated and interviewed. This was seen as a subjective account of the truth about the e-Gov progress and benefits which was not fully aligned with the aim of this research. For example, officials were adamant that e-filing was a great success in the Ministry but after conducting some interviews with lower ranking employees in the Ministry; it was obvious that the

claimed success was on paper only and the system itself has not started yet. Success or efficiency and effectiveness can be gauged when the feedback is received from the intended users and that was not the case in the e-filing system.

6.6.0: The Final Node Dilemma

Trajectory mapping technique was used in a failed project by Law and Callon (1992) where an end node was clearly explained since the project was scrapped at a certain identified date; similarly Gasson (2006) used the trajectory mapping technique to explain the software development process; when the software was completed (another fixed identified time), the final node was clearly representative of the situation; Heeks and Stanforth's (2007) use of trajectory mapping ended with a stoppage of the progress in automation pending funding, therefore, the final node was somehow not clarified in full. In other words, if the same project was investigated nowadays and not in 2007, that final node listed is definitely not the final node anymore.

In this research, it is quite obvious that the ongoing work is still in progress and will be in progress 'endlessly'. Hence, the 'final' node presented on the graph of the trajectory map must have a stamped date (1-5-2010), the author suggests, to clarify where the 'study stopped' and not where the e-Gov effort or the e-project stopped. To re-iterate, the researcher suggests putting a label under the trajectory map's figure showing the period or the span of time that elapsed in the evolvement of such ICT project.

6.7.0: Likely Reasons for the Obtained Results

Trajectory mapping was obtained after conducting numerous interviews with different ranking officials and employees in the Ministry. The data gathered was obtained from structured, semi-structured, and in some cases non-structured interviews that were mostly tape recorded after receiving permission to do so. The staunch difference in the interviewees' accounts, based on their political affiliations, produced extreme positions from either side regarding the making and deployment of the EGIS. This in turn, might have caused the extreme decisions taken by the administration's officials in regards to halting or slowing down the project which can explain the sudden sharp veering of the lines connecting the nodes on the plotted diagram (fig 4.2).

Bureaucracy can be cited for disallowing interviewees from expressing their full opinion. This was clear to the researcher from the pondering and questioning by the interviewees in regard to who will see or know about their answers. The obvious insecurity on the job led to a reserved atmosphere that surrounded most of the interviews. This in turn, might have affected truth telling.

Designing the questionnaire, though based on questions validated from previous studies conducted elsewhere, lacked the local keenness that could have produced more appropriate responds. This was due to lack of academic studies in the research site. Furthermore, employees looked to be reserved in filling up the questionnaires not knowing the aim of the research which could have rendered their reply as artificial. Despite the statement on the first page of the questionnaire clarifying the aim, the method of delivery created a stressful atmosphere. This is due to the fact that in all the

municipalities but one, the researcher was not allowed to have any contact with the employees, but rather an order by the head of the revenue department via email was sent to all employees, who have never been surveyed before, asking them to comply within two days.

6.8.0: Conclusion

The last two chapters used proper analytical tools to analyse the qualitative and quantitative primary and secondary data gathered to examine whether they agree or disagree with the propositions posed by comparing and contrasting the findings from the interview (qualitative) stage with those findings from the questionnaire (quantitative) stage and where some of these views were divergent, efforts were directed towards resolving or understanding this divergence based on analysing the case at hand. The two methodologies proved to be complementary especially since the project life span was long and divided in two stages dealing with pre and post EGIS deployment.

CHAPTER SEVEN

CONCLUSION AND FUTURE WORK

7.0: Introduction

This chapter includes a conclusion of the overall work conducted throughout this thesis. It concentrates on showing how the results of the study relate to the main objectives and questions posed in this research. Furthermore, it also links the research findings by inspecting similarities and dissimilarities between prior researches and findings. Therefore, the chapter consists of two important parts. The first one is the contribution of the research to the ICT impact studies and to the use of IT relative theories. Secondly, it presents the recommendations for future work in this area.

7.1.0: An Overview of the Study

The study was aimed at trying to assess the impact of ICT on government finances. This aim was broken down into several objectives as shown below:

- I. To investigate the trajectory of the Electronic Government effort in the Revenue Department of the Lebanese Ministry of Finance (e-MoF) in the context of an under-developed economy.
- II. To assess the employees' perceived effectiveness of an EGIS project on the functioning of the public organisation.
- III. To check the relationship between the degree of success of the trajectory taken by an EGIS and the employees' perceived effectiveness on the functioning of a public organisation.
- IV. To gauge the impact of an EGIS project in revenue collection.

- V. To empirically check the applicability of multi-theory models as appropriate theoretical framework in studying ICT projects.

Reviewing the literature on e-Gov and ICT impacts aided in identifying gaps that exist and identified seven propositions to explain the sought after objectives. In addition, during the progress of the project, three questions emanated from the first phase of the investigation (the qualitative part). The proposition and the questions are listed below:

- I. Trajectory mapping of an e-Gov effort exposes the relative contextual factors involved and benchmarks the EGIS success
 - II. Trajectory mapping is a useful tool in identifying and listing EGISs and exposes their current status of deployment
 - III. ICT improved information quality
 - IV. ICT improved service delivery to citizens
 - V. ICT has had a positive impact on the functioning of the Lebanese MoF
 - VI. ICT improved revenue generation at MoF
 - VII. The level of success given by the trajectory mapping technique has a direct causal effect on the impact of an EGIS
- and

4.4.1.1: Are the majority of employees at the MoF young, educated, and computer savvy?

4.4.1.2: Are the training and institutional practices adequate to prepare public employees for the mission?

4.4.1.3: Did automation reduce the workload?

The propositions were meant to be answered and fulfilled by this research to affirm or negate the propositions suggested, thereby moving the frontier of

knowledge in this field. Answering the questions mentioned above meant verifying the posed issues presented by the interviewees and in turn sheds a light on the actual situation in the Lebanese Ministry. Fulfilling the answers to the propositions and questions required two consecutive stages of empirical research where the researcher suggested that they complement each other. Primary data collection was deemed suitable for the qualitative (un-structure and semi-structured interviews) and the following quantitative (questionnaire) research stages. This was then followed by secondary data collection from websites and articles. Univariate and multivariate analyses were conducted on the data, presented in chapters four and five of this thesis, to assess the research implications and future work in the area of ICT impact on government's financial institutions with a view of making some contribution to knowledge.

Drawing together the discussions and analyses conducted in the previous six chapters, the remainder of this chapter recaps the key findings of the study and their contribution to knowledge and in particular to the area of ICT impact studies on finances. The chapter then identifies the limitation posed by this study and suggests important venues for further discussion and exploration in future related research topics.

7.2.0: ICT Impact: Current State of Affairs

Revenue collection benefited from the use of ICT tools and techniques in the Lebanese MoF. This study finds tax reporting, accuracy, real data collection, data analysis, inter-governmental communication, as well as overall government ministries' financial integration and preparing the Lebanese government budget as the foremost tasks that benefit from the use of ICT.

Furthermore, ICT enabled the forecasting of future trends in the budgetary process.

The study also finds that the aspect of revenue collection that benefit the least from ICT implementation include lack of communication between government offering services and the supposed clients (the citizens). The overall study shows that a holistic study of ICT impact on the functioning of the revenue department is more comprehensive than studying pre deployment or post deployment of ICT tools and techniques.

In addition, the study finds that the uses of ICT tools are likely to be irreversible when deployed for a lengthy period of time. The irreversibility stems from abandoning old manual methods and training new public servants on ICT enabled work process in conducting revenue collection. This rendered resorting back to old methods as hard to accomplish if not obsolete.

The study also finds that MoF managers, despite being in a bureaucratic organisation, were able to communicate with lower managers and staff bypassing middle managers' roles and eventually reducing their numbers, hence reducing operating cost. Managers were also able to speed up decision making. Factual data analysis allowed for a more statistical based judgement rather than the sole experienced or hunch decision.

Furthermore, the study shows that departments that produced ICT software gained power (by the virtue of technical knowhow) and increased

employees' salaries in the set department. The proficiency in using ICT tools by governmental employees increased their workload rather than reducing it, but enabled them to produce and process more tasks. Analyses of the data showed that revenue employees were content with ICT tools in providing accurate, adequate, and in timely information allowing them to better and faster functioning.

The study showed that the training, being inadequate, impacted the technology cognition of employees, and made recommendations that training issues must be rectified in order to improve employees' ICT cognition and that, in turn, will enhance their performance and their dealings with technology. Furthermore, the study found out that the ICT environments adopted by the government were satisfactory and the hardware provided was sufficient to carry out the automating task at hand.

In spite of these benefits to the workflow at the Ministry, the study found out that the workload was not reduced due to ICT implementation as proposed by the literature reviewed. This unexpected result was then explained by exploring the data further. Finding out that citizens were not using or aware of the web services offered, for reasons not ascertained in this research due to budget and time constraints, made the work load stable in the public workers' perception. Web services were meant to lift some of the burden from employees as tax advisors or general financial advisors to the public, yet not using the service rendered the web effort as useless.

Furthermore, as far as Lebanon is concerned, this study was the first academic and empirical effort on the functioning of the Ministry of Finance.

The study was able, from an ICT perspective, to objectively identify the good work from the bad efforts as perceived by the majority of the employees surveyed. Objectivity in quantifying ICT efforts in the Ministry has been the debate of two very opposed parties. One favours the automation process and the e-MoF effort, while the other is a staunch rejecter of such efforts. The effort in this research, being as objective as possible, will indeed benefit the decision makers in the country on what is a sound project and what is not.

7.3.0: Implications to the Academic Community

The study was able to assess the usability of a novel method in researching ICT applications in a developing economy. The method of global and local network framework, was originally used by Law and Callon (1992), and was used for the first time in e-Gov projects by Heeks and Stanforth (2007) to map out the trajectory of the IT project studied. The researcher, similar to Heeks and Stanforth (2007), used the method as a framework, tested and analysed the case at hand in the qualitative phase of the study, to show that the global and local network framework was indeed suitable to identify the symbiotic relationships between the many different stakeholders that are inherent in the designing and building of governmental programmes. The research also proved that the method was suitable for a longitudinal analysis of a case study and that it has the potential to expose the different aspirations presented by political and powerful groups. The framework was used as a guide directing or hinting to the researcher what to expect during the evolvement of the research.

Furthermore, a proposed model was suggested for the complementary quantitative part of the research. This model was based on Orlikowski's

Model of Technology that relied on Giddens Structuration theory (Orlikowski 1992). The study showed that Orlikowski's model does fit the Lebanese situation with some alteration regarding citizens' participation and web applications. The study further showed that combining methodologies and splitting the research efforts into two distinct yet inter-related phases was crucial in obtaining results and helped in establishing validity and reliability.

Heeks and Stanforth (2007), in investigating the e-Gov design of the MoF of Sri-Lanka claimed a trajectory mapping 'degree of success' state based on the position of the final node. This study further investigated the issue of trajectory mapping in the e-Gov design of the MoF in Lebanon, yet contrary to Heeks and Stanforth's (2007) findings, the degree of success given by the 'final node position' was found to be misleading due to the fact that such a projects' life span does not end by the end of a research project on IT implementation and is on an ongoing basis. This research suggested a 'date label' to be assigned to the 'final node position' to allow the reader to understand when the research effort by the said researcher/s was stopped. This suggestion might alleviate this deceptive 'end status' suggested earlier.

The study consequently found that there is no relation between the 'degree of success' state and the benefits sought from e-Gov implementation. The 'degree of success' suggested, was found to indicate the progress of the design process phase only. Analyses also showed that despite how good the design process is; the implementation and the interaction between employees and technology, in addition to citizens' awareness of the e-Gov benefits are all aspects that will dictate the success or demise of e-Gov services.

Hence, the linkage between 'ICT benefits' and 'degree of success' could be summed as such: it is necessary to have a good 'degree of success' in the design process, however, this is not sufficient for the success of the project as a whole. It is merely one element in the success of a huge project such as an e-Gov project.

Furthermore, the study was an attempt to analyse a holistic examination of the impact of ICT conducted in an extremely volatile environment such as the country of Lebanon. During the project's duration, the government changed hands twice between two opposing foes, one pro-EGIS and the other against. This unique situation or contingency supports the principle that stipulates: there is no one best way to organise universally due to different factors in each research site (Omoteso et al. 2007). The study showed that despite one's opposition to EGIS, the irreversibility aspect of technology mentioned in the ANT language forced the ICT track to take shape. This track, sometimes during the study, was adamantly rejected due to funding, appropriating staff, structure changes, and fear of private information leak. Yet, the same technology opposing team realised the essence of having such technology in informing the government and hence, was forced to accept this 'evil' for the benefits it delivered. This was a clear sign that ICT has a deterministic effect in public organisations, at least in the research site selected. Halting of the automation process at times, due to politics, proved that in the same research project social determinism may exist. Prior work done on ICT impact studies claimed to reject the technical determinism (Heeks and Stanforth 2007).

7.3.1: Reveal and Refinement of an Alternative Model

An alternative model suggested by Omoteso et al. (2007) (see Fig 7.1 below) was found to be applicable in underpinning a study on the impact of ICT on functioning of the revenue department. However, the two outstanding theories that were deemed useful in this study regarding analyses and the conclusion on the proposition were the socio-technical theory in the analysis of the qualitative part of this research and structuration theory in the later quantitative part. The two theories were complementary to each other as one part (qualitative) had to supersede the quantitative part. Using the socio-technical theory guided the researcher on the limits of to what extent the qualitative part should be investigated.

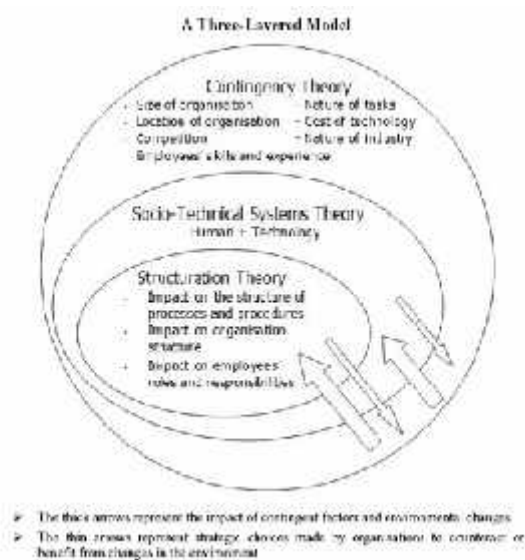


Fig 7.1: The Three Layered Model (Omoteso et al. 2007, P. 24)

While the model conformed with project management techniques where feasibility study looks at the given or available resources, then plan and design a project to match the set of given resources. The meta-theory proposed suggested a three layered model summing contingency, socio-technical, and structuration theories with 'contingency theory as its bedrock

upon which the other two theories were built for a meaningful understanding' of the ICT impact' (Omoteso 2006, P. 271).

The model assumed static contingency element such as in the company size, employees skills, experiences, politics involved, loyalty of public employees, cost of technology, and nature of tasks. This assumed static or fixed contingency is understandable due to the fact that Omoteso (2006) developed the model while investigating the holistic impact of ICT on auditing in his PhD thesis taking large size companies in the United Kingdom as data collection and research sites. Being conducted in a politically stable country with firm policy making and due process, the authors' suggested model can arguably be seen as adequate for researchers in a holistic study in such a similar environment or in a developed country environment.

This study, on the other hand, and in the Lebanese case, found out that assuming static contingencies is not appropriate in an area where political turmoil is at hand. The Lebanese situation showed that the ICT project can run its course, can pause abruptly even at a late stage of implementation, shut down completely for a period of time, re-start at a later stage depending on politics, war, loyalty of public servants to the team carrying out the implementation of the ICT project, and the will of decision makers. This stop and go situation and the constant power shifts involved more money and time allocated at different times which contradict the feasibility study or the model suggested that assumes static contingencies.

The findings of this study suggest that the model needs to be refined to allow for ongoing base assessment due to the fact that the initial given

situation or contingent factors may change drastically. The researchers using the model must keep track of the changing environment and encompass those forcible changes in the application of the model. The proposed refined model is shown in Fig 7.2.

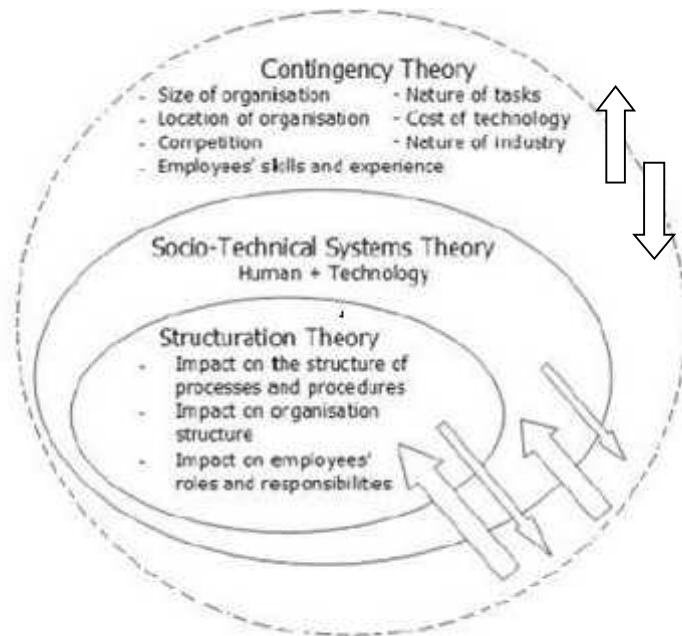


Fig 7.2: The refined Three Layered Model

The new arrows suggested take into consideration the changing environment and its effect on the contingency element of the model. This study claims to empirically test the three layered model and showed its applicability in a holistic ICT impact study.

7.4.0: Implications for Policy Makers

In conclusion, the study was able to offer some advice for policy makers when they are embarking on an e-Gov programme:

1. Policy makers in a programme must design a strategic plan and incorporate all the hindrances noticed in this effort. Each organisation should forecast and examine the local contextual factors. The study conforming to the contingency theory, showed that there is not one best way to apply an ICT programme. Rather, organisations must conduct analysis of its own to design the proper solution for the set organisation.
2. In the Lebanese case-study, it was evident that the objectives of the programme, or even the multi projects involved, were not conveyed to the users. Public servants felt that they are like machines that are supposed to apply the changes without knowing what the organisation's aim was. This uncertainty on the job reduced the passion and the motivations of employees. Therefore, it is advisable that policy makers direct implementers and managers to clearly divide organisations' objectives to smaller objectives for each department where the sum of these objectives, will in turn, for the organisations' objectives, then sell the objectives to the employees in stages.
3. Induct or integrate the IT team into the organisations' teams. As was obvious with the study, the "I" and the "they" were two pronouns used throughout the interviews. Having major division inside an organisation is arguably very damaging for the organisation's output. Policy makers should make sure that the newly installed IT unit is fully integrated, accepted, and treated as any other unit in the organisation.
4. In project management tasks are line up based on resources and time allocation. It must be obvious to policy makers that enactment of digital economy laws in an e-Gov effort must precede the implementation of these technologies. From the Lebanese case, e-taxation was ready to roll technically, but e-money and digital signature laws were not enacted in parliament and hence the project

was blocked and could not be activated. These hindrances slow down other tasks in large projects. Therefore, pro-active planning must take shape before or during the implementation of any IT project.

5. Policy makers should weigh the cost of recruiting software designers or outsource the design process since designing, as in the Lebanese case, was conducted at early stages of the programme. It is a balance between cost and security that policy makers in each setting must balance based on their particularities.

7.5.0: Implications for Organisations and Managers

It was evident from the case study that designing and implementing are two different and distinct parts of a programme. In the analysis, it was shown that despite how great a design can be, implementation remains a key to success for any given project. Implementers and managers are responsible to deliver. Below are some implications on the changes of the roles of managers in the organisation and on the power struggle that they might face when an IT programme is taking shape.

7.5.1. Power Shifts and Role of Managers

The use of trajectory mapping was seen as an imperative tool for the researcher in the initial investigation process. The reason for that stems from its strength in exposing contextual factors, its ability to identify social and technical determinism at different stages of the investigation, its suitability in revealing political wrangling, and in identifying the actual 'power to' rather than 'power over' in a public institution. The social approach of e-Gov studies neglected the effect of ICT empowerment. This study, however, showed clearly that, within the ICT unit at the MoF, power was gained due

to the technical knowledge. This power affected the chain of command in the rigid public organisation. The new power was feared by traditional managers and rejection or opposition to this new rising power was evident throughout the investigation.

Managers of change must strategically predict the ICT empowerment factor demanded by an IT unit and should incorporate this power smoothly within the organisation to better integrate it in the companies' structure. Focusing only on the technical aspect and ignoring the social aspect will similarly lead to the technical project's demise despite how technically sound it might be. Therefore, managers must plan for the future induction of the emerging technical unit and the eventual reconstruction of the organisation taking into consideration the technical and social sides.

7.5.2. Training

The results of the questionnaire obtained via regression analysis yielded a principle for information quality. The lack of benefits received due to the ICT impact was mostly attributed to the lack of ICT cognition among employees. With the fact that 'technology advances many times more than social networks' (Ruikar and Chang 2012, P. 2599), managers must focus on contemporary 'for the job training' (job related training) that should be a continuous process in the ever-changing ICT environment to re-enforce the socio-technical bond and yield uninterrupted positive results.

7.5.3. Vertical Communication

Lack of vertical communication, as observed in the researched Lebanese public institution, between users, ICT designer and decision makers

weakened the whole change process. The nature of the public organisation in the said country may have been a hindrance to sharing of information. It seemed to the researcher that the essence of knowledge management is not a priority. In contrast, withholding information among the same department and between departments seemed to be the norm. The suggestion was for managers to perform ICT enabled knowledge management training and awareness of its benefits, in addition to an open doors policy and a transition from the mechanistic (bureaucratic) form of the organisation to an organic (flat) structure.

7.6.0: Implications for Practitioners

The study dealt with the impact of ICT in a developing nation with high political instability. The findings suggest that in such an environment studying an EGIS requires the focus on many aspects:

- For researchers in developing nations, the political influence on the decision level and on administration level must be investigated before any claim of success or failure of the EGIS project. It was obvious from this research's results that politics plays a major role in a country-wide project.
- The study of EGIS's impact must consider the evolution of the project to detect the relative contextual factors and several elements such as software programs ownership, implementation time, leadership, employees' rejection or acceptance, employees' loyalty, and the history of the political will towards the project.
- The use of multi-methodology and multi-theory was arguably a helpful guide throughout the project's phases. Limiting oneself to a single theory or methodology, fearing contradictions in results, was seen as restraining the researcher from capturing the full picture. For

a holistic study it is advised that triangulation of sources is to be followed to enrich the findings and to allow for proper analysis of the findings.

- Approaching the subject matter objectively and allowing the truth to come out was seen as crucial. The study suggests a realist approach to investigate a large scale project. The use of ANT and its ontology was viewed as appropriate in this regard.
- The study of EGIS must focus on the socio-technical fusion. Social and/or technical determinisms were detected at different stages of the project's evolution. Politics seemed to majorly affect the social/technical determinism in a large EGIS environment at this particular research site.
- Training was found to be a key element in allowing the social network to accept the technical one and strengthen the socio-technical bond. Therefore, training programs must be investigated to ascertain their impact on the links inside the networks.

7.7.0: Limitations of the Study

Similar to other doctoral research work, the study was restricted by time and financial constraints. In addition, reluctance to give information by public servants was obvious throughout the data collection process. Bureaucracy was cited as the major stumbling block in conducting the interviews where officials, fearing retribution for giving 'company' information, demanded proper permission allowing them to be interviewed by an external body (the researcher). Technical limitations to the study are listed in the following paragraphs.

One limitation was the inability to assess the impact on the citizens of the country. This group is the most important group in an e-Gov application since the service design and implementation was meant to alleviate the burden of receiving government services in a traditional time consuming manner. This inability was due to logistical and financial constraints. In addition, other benefits could have been delivered to citizens in an on-line mode such as filling applications and forms. The inability of the government of Lebanon to enact laws for digital signature and allow e-money transaction rendered most on-line services obsolete. Consequently, this important part of any e-Gov application and its impact on people was not ascertained. Future work to gauge the citizens' reaction and opinions towards that service would complement the work done throughout this research effort.

An added limitation was the lack of knowledge of the contents of the training seminars and courses taken at the Lebanese finance training centre. Lack of proper training weakened the understanding of so many employees who felt that they lack ICT training and hence low ICT cognition. The training issue needed more attention for its major role in the success of the implementation process. The ability to gain knowledge of the continuous job related training issues could be a major key to produce a positive outcome.

A further limitation was the lack of knowledge of the e-government readiness of the country vis-a-vis internet penetration, speed, use, and cost. This was due to the lack of statistics in Lebanon regarding e-commerce or e-business. Based on the demand and supply vocabulary, access to the service is a critical element in adoption by the citizens. Since this was not clarified in the Lebanese case, future e-Gov research in similar areas should pay more

attention to this argument in order to be able to compare what services should be offered and to what type of customers.

7.8.0: Suggestions for Future Research

Based on the limitations of this study, it is suggested that future research in the area of ICT empowered e-Gov impacted studies could focus on the end users: the citizens. The technological artefacts and the users may be tightly knit and produce a flawless system but if the people, who are the beneficiaries of such services, do not perceive the EGIS as user friendly, then the sought after effectiveness might not be achieved. Tailoring the system under development to the needs and wants of the people might improve the whole design process. However, it must recognise that this is a costly and time consuming process.

It would be interesting to compare the results from the MoF with other Ministries in the country, for example the Ministry of Trade, and other levels of the government. The results obtained in the research implied that the way employees value ICT in their workplace is crucial for the advancement of the EGIS project and the e-Gov efforts. By elevating the employees technical and business process knowledge and preaching the benefits of e-Gov at the workplace may facilitate the adoption and better use of ICT's enabled artefacts. Another area of interest for future research would be to conduct a similar research, but only after the above mentioned training is conducted and all employees at the MoF were encouraged and not forced to participate in them, and then compare the obtained results with the results of this research.

The results of this research also showed technical and social determinism in the Lebanese case, it would be exciting to see if other future researches can produce similar results contradictory to other works that bashed the idea of technical determinism in e-Gov projects (Heeks and Stanforth 2007).

Actor Network Theory (ANT) has recently been used frequently as a framework to assess Information System (IS) related research. Reviewing the latest ANT related articles led to the identification of three trends of utilization. (i) The four 'Moments of Translation' feature, (ii) Information System trajectory plotting using the 'Mobilisation of Local and Global Networks' feature and (iii) the use of ANT in interpretivists' literature as a 'lens' to clarify and make their viewpoints understood. Based on the peculiarities of ICT utilisation, this research argues that the selective use of ANT features solely, may hinder the proper description of the situation. It is claimed that both the 'Mobilisation of Local and Global Networks' feature coupled with the 'Moments of Translation' feature of ANT and, contrary to its use by interpretivists, allowing ANT ontology to prosper, may give a better representation of facts with a view to solving e-Government (e-Gov) problems, an area yet to be adequately explored in the current body of literature (Rawas 2010). In other words, the proper use of ANT ontology and allowing 'reality to come out' may produce more realistic explanations to the findings. This could be the venue for future usage of the theory in IS related fields. Consequently, the use of the two different constructs of ANT allowed the author to better understand the incidents throughout the investigation and allowed for a clearer analysis of the findings. The notion of OPP in the 'four moments of translation' construct described clearly the alignment of the interests of the different stakeholders in the e-Gov project.

From the analysis, e-Gov application design, actor networks stability, and network mobilisation were not the only major component to produce or sustain positive impact. Political will was found to be the major enabler or hindrance to the ICT application. Leadership and power levels enticed by politics were the drivers for success or hindrances to the project. It is suggested that more focus should be directed towards the politics behind the e-Gov process, in addition to the other factors, despite how crucial they proved to be for the e-Gov application's success. Researchers in troublesome areas may need to take into account this crucial element when analysing the trajectory in such an endeavour.

More research should focus on the global and local network construct in conceptualising e-Gov projects with multiple stakeholders. Unlike the four moment of translation construct, which adhere to the idea of a champion who delivers the change by swaying all to his or her views, the study showed that the champion does not exist in a large project. Global and local construct of ANT called for the global network to obtain and mobilise resources and the local network to maintain the stability of implementation of the e-Gov application and on ensuring that the EGIS as an agreed obligatory point of passage by both networks. The study was able to identify both networks among the multi stakeholders and showed that when the OPP was agreed on, positive outcome was produced. However, when this agreement was uncertain, the outcome of the project deteriorated. More research focusing on the roles of networks regarding the OPP and the outcome from an EGIS would be interesting in different economies.

Finally, as a result of the exploratory nature of this effort, it will be entertaining to see how future research efforts on ICT impact studies will be

forthcoming regarding the end users' participation and the link, if it exist, between the success of a technical project and its impact on citizens and society as a whole.

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APPENDIX A

THE QUANTITATIVE RESEARCH INSTRUMENT: THE QUESTIONNAIRE

Questionnaire

The purpose of this questionnaire is to assess the perceived ICT impact in the Lebanese Revenue Directorate as a part of an academic research. All data will be handled with the utmost security and confidentiality. It is intended to be filled out by personnel that use a company computer in the workplace.

Please complete all sections by selecting the best responses for each questions based upon your view of your organisation.

Thank you in advance for your participation.

Section A:

THIS SECTION DEALS WITH INFORMATION ABOUT YOU AND YOUR ORGANISATION. ALL INFORMATION ENTERED WILL BE KEPT CONFIDENTIAL.

Kindly check the correct answer or fill in the blanks where needed.

| | | | | | |
|----|--|------------|------------|------------------|-----------|
| A1 | Which revenue directorate building do you work at? | VAT Bldg | BEIRUT | MOUNT LEBANON | TRIPOLI |
| | | € | € | € | € |
| A2 | Do you use a computer at work? | yes | no | | |
| | | € | € | | |
| A3 | What is your gender? | Male | Female | | |
| | | € | € | | |
| A4 | What is your level of education? | HS | College | University | Masters |
| | | € | € | € | € |
| A5 | Tenure in years | <5 | 5-10 | 11-15 | >15 |
| | | € | € | € | € |
| A6 | What is your age? | 21-25 | 25-34 | 35-44 | >45 |
| | | € | € | € | € |
| A7 | Your position at the organisation? | Line staff | Supervisor | Middle mgt | Executive |
| | | € | € | € | € |

SECTION B:

PLEASE RANK THE STATEMENTS BELOW FROM BY CIRCLING YOUR CHOICE ACCORDING TO THE SCALE GIVEN: (1) STRONGLY DISAGREE – (2) DISAGREE – (3) UNDECIDED –(4) AGREE –(5) STRONGLY AGREE

STRONGLY

AGREE

STRONGLY

DISAGREE

The questions below relate to you and your organisation:

| | | | | | | |
|----|--|---|---|---|---|---|
| B1 | If I heard about a new information technology, I would look for ways to experiment with it | 1 | 2 | 3 | 4 | 5 |
| B2 | Among my peers, I am usually the first to try out new information technology | 1 | 2 | 3 | 4 | 5 |
| B3 | I like to experiment with new ICT | 1 | 2 | 3 | 4 | 5 |
| B4 | I think ICT can decrease bureaucracy | 1 | 2 | 3 | 4 | 5 |
| B5 | I think ICT can promote fulfilment at work | 1 | 2 | 3 | 4 | 5 |
| B6 | I think ICT can foster social development | 1 | 2 | 3 | 4 | 5 |
| C1 | I believe that top management in our organization supports the ICT app. | 1 | 2 | 3 | 4 | 5 |
| C2 | Our organisation offers various types of ICT training programs | 1 | 2 | 3 | 4 | 5 |
| C3 | The training programs conducted were job related | 1 | 2 | 3 | 4 | 5 |
| C4 | Our organisation appraises ICT literacy of employees | 1 | 2 | 3 | 4 | 5 |
| C5 | Our organization evaluates the ICT applications that we work with regularly | 1 | 2 | 3 | 4 | 5 |
| C6 | Our ICT service desk does a great job in answering ICT related problems | 1 | 2 | 3 | 4 | 5 |
| D1 | I am satisfied with the reliability of the system. | 1 | 2 | 3 | 4 | 5 |
| D2 | I am satisfied with the system's ease of use. | 1 | 2 | 3 | 4 | 5 |
| D3 | I am satisfied that the system is always accessible. | 1 | 2 | 3 | 4 | 5 |
| D4 | I am satisfied with the system's packaged software. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|-----|---|---|---|---|---|---|
| D5 | I am satisfied with the system's processing speed. | 1 | 2 | 3 | 4 | 5 |
| D6 | I am satisfied with the system's network environment | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| E1 | I believe using ICT provided me with information that is useful | 1 | 2 | 3 | 4 | 5 |
| E2 | I believe using ICT provided me with information that is accurate | 1 | 2 | 3 | 4 | 5 |
| E3 | I believe using ICT provided me with information at the right time | 1 | 2 | 3 | 4 | 5 |
| E4 | I believe our IT personnel understand our business functions | 1 | 2 | 3 | 4 | 5 |
| E5 | I believe our IT personnel understand the organisation's policies and laws | 1 | 2 | 3 | 4 | 5 |
| E6 | I believe our IT personnel are free to assist users when needed | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| F1 | After deploying ICTs at work, our transparency had improved | 1 | 2 | 3 | 4 | 5 |
| F2 | After deploying ICTs at work, we can increase public participation | 1 | 2 | 3 | 4 | 5 |
| F3 | The Ministry of Finance's website has good information about all tax procedures | 1 | 2 | 3 | 4 | 5 |
| F4 | After deploying ICTs at work, we can service customers much faster | 1 | 2 | 3 | 4 | 5 |
| F5 | After deploying ICTs at work, we can deliver tailored services to citizens | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| G1: | I believe ICT increased job productivity | 1 | 2 | 3 | 4 | 5 |
| G2: | I believe ICT enabled me to do my job more quickly. | 1 | 2 | 3 | 4 | 5 |
| G3: | I believe ICT improved my judgment at work | 1 | 2 | 3 | 4 | 5 |
| G4: | I believe ICT reduced our interaction with citizens due to the web offered services | 1 | 2 | 3 | 4 | 5 |
| G5: | The web information reduced my work as a tax advisor | 1 | 2 | 3 | 4 | 5 |
| G6: | Putting all the tax material on the web was a good taxpayer teaching tool | 1 | 2 | 3 | 4 | 5 |
| G7: | I believe ICT has reduced my overall work load | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |

Thank you for completing the questionnaire.

أكاديمي

إن الهدف من هذا المسح هو تبيان مدى تأثير برامج المعلوماتية المعدة سابقا على الأدا
الوظيفي في مراكز المالية في لبنان. هذا العمل هو من ضمن دراسة أكاديمية ولا يمت للوظيفة

. كل المعلومات المعطاة ستكون محفوظة بطريقة مهنية ولن يكشف عن هذه المعل

. ن المفترض أن يتم تعبئة هذه الإستمارة من قبل المستخدمين في الوزارة ممن عندهم

حاسوب على المكتب ويستعملونه ضمن العمل.

شكرا سلفا على الإشتراك في هذا الجهد.

:_____

| A1 | VAT Bldg | BEIRUT | MOUNT LEBANON | TRIPOLI |
|----------------------------------|----------|--------|---------------|---------|
| في أي فرع أو محافظة من المالية | € | € | € | € |
| A2 | yes | no | | |
| هل تستعمل الحاسوب في أداء عملك؟ | € | € | | |
| A3 | | | | |
| هل أنت ذكر أم أنثى؟ | € | € | | |
| A4 | | مهنية | | ماجستير |
| ما هي أعلى شهادة حائز عليها؟ | € | € | € | € |
| A5 | <5 | 5-10 | 11-15 | >15 |
| كم سنة وأنت تعمل في المالية؟ | € | € | € | € |
| A6 | 21-25 | 25-34 | 35-44 | >45 |
| | € | € | € | € |
| A7 | | | | ثانية |
| ما هو منصبك أو درجتك في المالية؟ | € | € | € | € |

في هذه الأسئلة المذكورة أدناه الرجاء وضع دائرة حول الرقم المناسب حسب المقياس هذا: (1) غير موافق

(2) - غير موافق - (3) - (4) - (5)

| | 1 | 2 | 3 | 4 | 5 |
|----|--|---|---|---|---|
| B1 | من طبيعتي أنني أختبر التكنولوجيا بمجرد سماعي أنها جديدة وتحت التداول | | | | |
| B2 | من بين زملائي في العمل أنا أول من يجرب البرامج الجديدة التي | | | | |
| B3 | أنا أحب أن أستعمل التكنولوجيا الحديثة | | | | |
| B4 | أعتقد أن التكنولوجيا تقلل من البيروقراطية (الطبيعية) في العمل | | | | |
| B5 | أعتقد أن المعلوماتية تحفز الشعور بالرضى أثناء العمل | | | | |
| B6 | أعتقد أن المعلوماتية تساعد على | | | | |
| C1 | أعتقد أن الإدارة تدعم إستعمال نظم المعلوماتية في العمل | | | | |
| C2 | إدارتنا تقدم برامج متنوعة للتدريب والتدريب على استعمال المعلوماتية | | | | |
| C3 | إن البرامج التدريبية التي خضعت لها كانت مفيدة لي في عملي | | | | |
| C4 | مؤسستنا تمتحننا باستمرار لتقييم تقدمنا بالمعلوماتية | | | | |
| C5 | مؤسستنا تقيم البرامج المستعملة دوريا و بانتظام | | | | |
| C6 | إن الرقم الهاتفي المخصص للرد على أسئلتنا عن المعلوماتية مفيد وفعال | | | | |
| D1 | أنا مطمئن لأنني أستطيع أن أعتمد على جهاز الكمبيوتر لدي | | | | |
| D2 | أنا راض عن سهولة إستعمال أجهزة الكمبيوتر في المكتب | | | | |
| D3 | أنا راض لأن أجهزة الكمبيوتر تكون جاهزة للعمل في أي وقت أريده | | | | |
| D4 | أنا راض عن البرامج الموجودة وفعاليتها في العمل | | | | |
| D5 | الجهاز لدي في المكتب | | | | |
| D6 | أنا راض عن أداء شبكة المعلوماتية واتصالها الدائم بالمركز الرئيسي (nterData Ce) | | | | |

| | | | | | | |
|-----|---|---|---|---|---|---|
| E1 | أعتقد أن استعمال التكنولوجيا أمن لي معلومات هامة في عملي | 1 | 2 | 3 | 4 | 5 |
| E2 | أعتقد أن استعمال التكنولوجيا أمن لي معلومات صحيحة خاصة بالعمل | 1 | 2 | 3 | 4 | 5 |
| E3 | أعتقد أن استعمال التكنولوجيا أمن لي المعلومات التي أحتاجها في الوقت | 1 | 2 | 3 | 4 | 5 |
| E4 | أعتقد أن معدي البرامج المستعملة على اطلاق جيد بما نقوم به نحن من أعمال | 1 | 2 | 3 | 4 | 5 |
| E5 | أعتقد أن معدي البرامج المستعملة على اطلاق جيد بالقوانين المرعية الإجراء و | 1 | 2 | 3 | 4 | 5 |
| E6 | أعتقد أن معدي البرامج المستعملة على إستعداد لدعمنا معلوماتيا عندما نحت | 1 | 2 | 3 | 4 | 5 |
| F1 | بعد إدخال التكنولوجيا الى العمل إزدادت الشفافية في العمل | 1 | 2 | 3 | 4 | 5 |
| F2 | بعد إدخال التكنولوجيا الى العمل نستطيع ان نزيد من مشاركة المكلفين في | 1 | 2 | 3 | 4 | 5 |
| F3 | إن الصفحة الخاصة بالمالية تتضمن معلومات هامة عن كافة الضرائب المتوجبة المكلفين | 1 | 2 | 3 | 4 | 5 |
| F4 | بعد إدخال التكنولوجيا الى العمل نستطيع أن نقدم خدمات للمكلفين | 1 | 2 | 3 | 4 | 5 |
| F5 | بعد إدخال التكنولوجيا الى العمل أصبحنا قادرين على ان نفصل ونوزع إعطاء الخدمات حسب احتياجات كل مكلف | 1 | 2 | 3 | 4 | 5 |
| G1: | أعتقد أن المعلوماتية زادت من الإنتاجية في عملي | 1 | 2 | 3 | 4 | 5 |
| G2: | أعتقد أن المعلوماتية سرعت من أدائي لعملي | 1 | 2 | 3 | 4 | 5 |
| G3: | أعتقد أن المعلوماتية سهلت لي إتخاذ الأحكام والقرارات في بعض الحالات بالعو | 1 | 2 | 3 | 4 | 5 |
| G4: | أعتقد أن الصفحة الإلكترونية الخاصة بالمالية خففت من إتصالي مع المكلفين | 1 | 2 | 3 | 4 | 5 |
| G5: | خففت الصفحة الإلكترونية من مهامني كمجيب على أسئلة المكلفين بالقض الضريبية | 1 | 2 | 3 | 4 | 5 |
| G6: | إن وضع الصفحة الإلكترونية كان مفيدا في تعليم المكلفين وارشادهم عن ال | 1 | 2 | 3 | 4 | 5 |
| G7: | أعتقد أن التكنولوجيا خففت من إجمالي عملي | 1 | 2 | 3 | 4 | 5 |

نهاية الأسئلة شكرا على تعاونكم

APPENDIX B

THE QUALITATIVE RESEARCH INSTRUMENT:

THE QUESTIONS

QUALITATIVE QUESTIONNAIRE FOR MoF OFFICIALS:

1. Who came up with the reform idea at the MoF and when?
2. Was the reform idea for the MoF or the whole administration?
3. What was the first priority in the plan?
4. Who was in charge of the plan?
5. Who were the donors and the financiers for the IT infrastructure?
6. Can you identify the Local actors and global actors or networks?
7. How many software packages are/were used? The need is for a list of software in each department? Customs, VAT, land and property, and inheritance.

Tax software is what?

How many users?

Does it run on pc or a mainframe or a server of some sort?

Is it compatible with other modules?

8. Was the SDLC conducted with the participation of management and knowledge workers? Was there a sign off document?
Any software creep?
Who is responsible for the maintenance phase of the project?

9. Was the project done through a tender process or was there a committee responsible for the project's inception?

10. Was a feasibility study conducted prior to the project tender process if it existed?

11. Was the project checked if it was on budget or not after completion?
If yes who did that?

12. Was flexibility of the software a problem?
Are there means to report software bugs?

13. During the trajectory of the software, was all smooth cruising or were there some milestones? If yes, what were they?

14. Did problem arise from:
 - a) Staffs' resistance

 - b) Lack of training

 - c) Laws that did not exist to conceptualise technology adopted

15. During and after implementation was there a shift from decentralisation to re-centralisation due to the use of IT?
16. Is there data on FT-employees' numbering throughout the process of design to currently?
17. Can the cost of Tax collection effort be calculated in each province?
18. When was income tax return available on-line?
19. Are there any statistics on whom and how many use (number of entities and not the money amounts) on-line income tax return during the years it was available?
20. Is there a figure on how much cost was incurred by the outsourcing in the tax collection office? (contractor services, advisors, consultants, etc)
21. What was the biggest investment in the tax office and on what?

22. Is there a distinction of what was donated and what was actually paid by the government?
23. ICT expenditure: FTE, Contracts, consultants, IT advisors, hardware...etc. Can this be quantified?
24. What is the count on the number of registered individuals and businesses who are taxed?
25. Is there a count of the number of registered who file using paper-online?
26. How do you describe your empowerment in the tax department?
27. Is there an Integrated Financial Management Information System (IFMIS) (revenues, expenditures, and budget)?

28. How many Off the Shelf (OTS) modules or automated tax system are at the Ministry?

29. How many users are on the system in total (Sigtas, Asycuda ++ etc..)?

30. Is there a telephone assistance hotline for tax help? Details please

31. Tax consultants and experts or organisation help in tax filing; do they exist? How many?

32. What is the effect or role of the big 4? Pwc, deloitte, etc?

33. Is there a private or a special audit department to nab tax evaders? If yes what kind of technique do they use (software wise)? Any AI, DSS, or data mining capacity at MoF?

34. E-commerce: are there laws allowing e-charge – e-payment? How are these transaction taxed if they exist? Can they be audited?

35. Was there any review conducted regarding the modernisation of the revenue department by external agencies? Donors? IMF? CIDA? UNDP? If yes, are there any reports available by these different bodies on the progress of the development at the MoF?

36. Do you have figures on e-services regarding:

a) Vat clients' number, how many filers, how many use e-Vat service?

b) PIT? CIT? How many file tax returns and how many don't?

- c) Do you have an annual count on new registrants over the last 20 years?
- d) Do you have a hit rate from the web sites on tax? Annual/monthly?
- e) E-info request by citizens? Any hit rate?
- f) Cost of e-services and infrastructure; can it be quantified?
- g) What is the operational cost of the IT work at the ministry monthly or annually?

37. Has a cost analysis been conducted to check cost reduction by the least operational cost and employee reduction after e-services application went into effect?

38. Has an evaluation been conducted on the e-services website?

39. Are you able to estimate the shadow economy after cross checking bank IS and individual companies? Is the bank secrecy an obstacle to block this attempt?

APPENDIX C

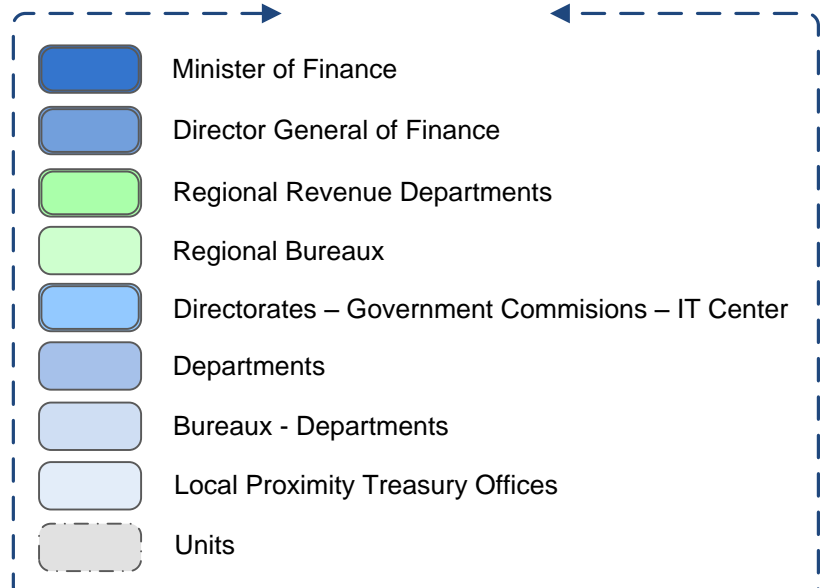
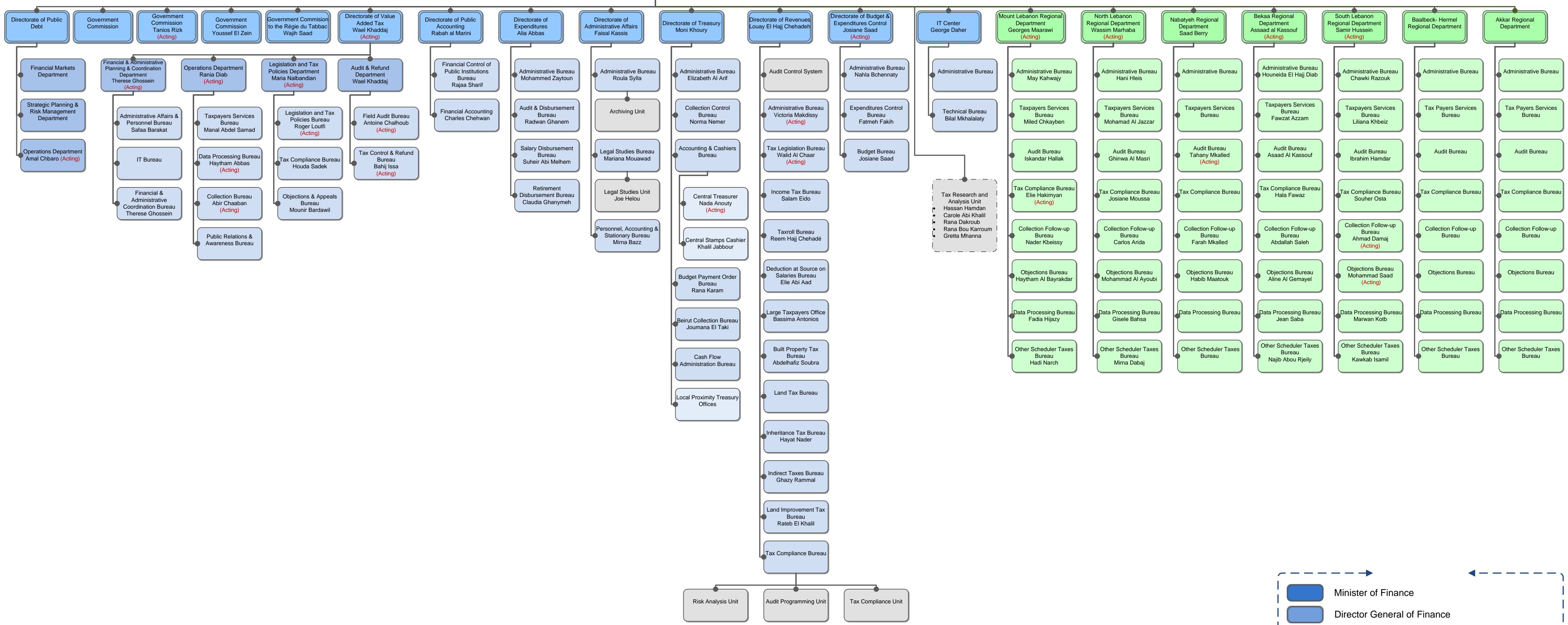
THE ORGANISATION CHART (2010-2011)



Republic of Lebanon
Ministry of Finance
Organizational Chart

MINISTER OF FINANCE
Raya Haffar

Director General of Finance
Alain Bifani



APPENDIX SPSS

1

DESCRIPTIVE STATISTICS

FREQUENCIES

```
VARIABLES=a1 a2 a3 a4 a5 a6 a7 b1 b2 b3 b4 b5 b6 c1 c2 c3 c4 c5 c6 d1 d2 d3
d4 d5 d6 e1 e2 e3 e4 e5 e6 f1 f2 f3 f4 f5 g1 g2 g3 g4 g5 g6 g7
/BARCHART PERCENT
/STATISTICS=MEAN MEDIAN
/ORDER= ANALYSIS .
```

Frequencies

Statistics

| | | A1: Which revenue directorate building do you work at? | A2: Do you use a computer at work? | A3: What is your gender? | A4: What is your level of education? | A5: Tenure in years? | A6: Your age? |
|--------|---------|--|------------------------------------|--------------------------|--------------------------------------|----------------------|---------------|
| N | Valid | 332 | 331 | 332 | 332 | 331 | 331 |
| | Missing | 0 | 1 | 0 | 0 | 1 | 1 |
| Mean | | 2.74 | 1.01 | 1.46 | 3.07 | 2.50 | 2.60 |
| Median | | 3.00 | 1.00 | 1.00 | 3.00 | 2.00 | 3.00 |

Statistics

| | | A7: Your grade level at the organisation? | B1: If I heard about a new information technology, I would look for ways to experiment with it | B2: Among my peers, I am usually the first to try out new information technology | B3: I like to experiment with new ICT | B4: I think ICT can decrease bureaucracy |
|--------|---------|---|--|--|---------------------------------------|--|
| N | Valid | 326 | 326 | 325 | 331 | 329 |
| | Missing | 6 | 6 | 7 | 1 | 3 |
| Mean | | 2.27 | 3.72 | 3.15 | 4.21 | 3.57 |
| Median | | 2.00 | 4.00 | 3.00 | 4.00 | 4.00 |

Statistics

| | | B5: I think ICT can promote fulfilment at work | B6: I think ICT can foster social development | C1: I believe that top management in our organization supports the ICT app | C2: Our organisation offers various types of ICT training programs | C3: The training programs conducted were job related |
|--------|---------|--|---|--|--|--|
| N | Valid | 332 | 332 | 331 | 330 | 330 |
| | Missing | 0 | 0 | 1 | 2 | 2 |
| Mean | | 4.03 | 3.92 | 3.88 | 3.49 | 3.52 |
| Median | | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |

Statistics

| | | C4: Our organisation appraises ICT literacy of employees | C5: Our organization evaluates the ICT applications that we work with regularly | C6: Our ICT service desk does a great job in answering ICT related problems | D1: I am satisfied with the reliability of the system. | D2: I am satisfied with the system's ease of use. |
|--------|---------|--|---|---|--|---|
| N | Valid | 331 | 330 | 331 | 332 | 332 |
| | Missing | 1 | 2 | 1 | 0 | 0 |
| Mean | | 2.39 | 2.86 | 2.87 | 3.51 | 3.63 |
| Median | | 2.00 | 3.00 | 3.00 | 4.00 | 4.00 |

Statistics

| | | D3: I am satisfied that the system is always accessible. | D4: I am satisfied with the system's packaged software. | D5: I am satisfied with the system's processing speed. | D6: I am satisfied with the system's network environment | E1: I believe using ICT provided me with information that is useful |
|--------|---------|--|---|--|--|---|
| N | Valid | 331 | 331 | 332 | 332 | 332 |
| | Missing | 1 | 1 | 0 | 0 | 0 |
| Mean | | 3.25 | 3.22 | 2.93 | 3.19 | 3.76 |
| Median | | 4.00 | 3.00 | 3.00 | 3.00 | 4.00 |

Statistics

| | | E2: I believe using ICT provided me with information that is accurate | E3: I believe using ICT provided me with information at the right time | E4: I believe our IT personnel understand our business functions | E5: I believe our IT personnel understand the organisation's policies and laws | E6: I believe our IT personnel are free to assist users when needed |
|--------|---------|---|--|--|--|---|
| N | Valid | 332 | 332 | 331 | 330 | 332 |
| | Missing | 0 | 0 | 1 | 2 | 0 |
| Mean | | 3.75 | 3.65 | 3.21 | 3.15 | 3.25 |
| Median | | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |

Statistics

| | | F1: After deploying ICTs at work, our transparency had improved | F2: After deploying ICTs at work, we can increase public participation | F3: The Ministry of Finance's website has good information about all tax procedures | F4: After deploying ICTs at work, we can service customers much faster | F5: After deploying ICTs at work, we can deliver tailored services to citizens |
|--------|---------|---|--|---|--|--|
| N | Valid | 332 | 328 | 328 | 332 | 329 |
| | Missing | 0 | 4 | 4 | 0 | 3 |
| Mean | | 3.44 | 3.38 | 3.59 | 3.85 | 3.65 |
| Median | | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |

Statistics

| | | G1: I believe ICT increased job productivity | G2: I believe ICT enabled me to do my job more quickly. | G3: I believe ICT improved my judgment at work | G4: I believe ICT reduced our interaction with citizens due to the web offered services | G5: The web information reduced my work as a tax advisor |
|--------|---------|--|---|--|---|--|
| N | Valid | 332 | 331 | 331 | 328 | 329 |
| | Missing | 0 | 1 | 1 | 4 | 3 |
| Mean | | 3.77 | 3.83 | 3.46 | 2.96 | 2.82 |
| Median | | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 |

Statistics

| | | G6: Putting all the tax material on the web was a good taxpayer teaching tool | G7: I believe ICT has reduced my overall work load |
|--------|---------|---|--|
| N | Valid | 331 | 327 |
| | Missing | 1 | 5 |
| Mean | | 3.16 | 3.10 |
| Median | | 3.00 | 3.00 |

Frequency Table

A1: Which revenue directorate building do you work at?

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-----------|-----------|---------|---------------|--------------------|
| Valid VAT | 17 | 5.1 | 5.1 | 5.1 |
| BEIRUT | 132 | 39.8 | 39.8 | 44.9 |
| MT LIBAN | 103 | 31.0 | 31.0 | 75.9 |
| TRIPOLI | 80 | 24.1 | 24.1 | 100.0 |
| Total | 332 | 100.0 | 100.0 | |

A2: Do you use a computer at work?

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|----------------|-----------|---------|---------------|--------------------|
| Valid YES | 329 | 99.1 | 99.4 | 99.4 |
| NO | 2 | .6 | .6 | 100.0 |
| Total | 331 | 99.7 | 100.0 | |
| Missing System | 1 | .3 | | |
| Total | 332 | 100.0 | | |

A3: What is your gender?

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|------------|-----------|---------|---------------|--------------------|
| Valid MALE | 180 | 54.2 | 54.2 | 54.2 |
| FEMALE | 152 | 45.8 | 45.8 | 100.0 |
| Total | 332 | 100.0 | 100.0 | |

A4: What is your level of education?

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|----------|-----------|---------|---------------|--------------------|
| Valid HS | 5 | 1.5 | 1.5 | 1.5 |
| COLLEGE | 41 | 12.3 | 12.3 | 13.9 |
| BACHELOR | 212 | 63.9 | 63.9 | 77.7 |
| MASTER | 74 | 22.3 | 22.3 | 100.0 |
| Total | 332 | 100.0 | 100.0 | |

A5: Tenure in years?

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|----------------|-----------|---------|---------------|--------------------|
| Valid <5 | 65 | 19.6 | 19.6 | 19.6 |
| 5-10 | 102 | 30.7 | 30.8 | 50.5 |
| 11-15 | 99 | 29.8 | 29.9 | 80.4 |
| >15 | 65 | 19.6 | 19.6 | 100.0 |
| Total | 331 | 99.7 | 100.0 | |
| Missing System | 1 | .3 | | |
| Total | 332 | 100.0 | | |

A6: Your age?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|--------|-----------|---------|---------------|--------------------|
| Valid | 21-25 | 16 | 4.8 | 4.8 | 4.8 |
| | 26-34 | 141 | 42.5 | 42.6 | 47.4 |
| | 35-44 | 135 | 40.7 | 40.8 | 88.2 |
| | >45 | 39 | 11.7 | 11.8 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

A7: Your grade level at the organisation?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|--------|-----------|---------|---------------|--------------------|
| Valid | 5TH | 6 | 1.8 | 1.8 | 1.8 |
| | 4TH | 228 | 68.7 | 69.9 | 71.8 |
| | 3RD | 91 | 27.4 | 27.9 | 99.7 |
| | 5 | 1 | .3 | .3 | 100.0 |
| | Total | 326 | 98.2 | 100.0 | |
| Missing | System | 6 | 1.8 | | |
| Total | | 332 | 100.0 | | |

B1: If I heard about a new information technology, I would look for ways to experiment with it

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 5 | 1.5 | 1.5 | 1.5 |
| | DISAGREE | 45 | 13.6 | 13.8 | 15.3 |
| | UNDECIDED | 52 | 15.7 | 16.0 | 31.3 |
| | AGREE | 158 | 47.6 | 48.5 | 79.8 |
| | STRONGLY AGREE | 66 | 19.9 | 20.2 | 100.0 |
| | Total | 326 | 98.2 | 100.0 | |
| Missing | System | 6 | 1.8 | | |
| Total | | 332 | 100.0 | | |

B2: Among my peers, I am usually the first to try out new information technology

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 20 | 6.0 | 6.2 | 6.2 |
| | DISAGREE | 88 | 26.5 | 27.1 | 33.2 |
| | UNDECIDED | 73 | 22.0 | 22.5 | 55.7 |
| | AGREE | 110 | 33.1 | 33.8 | 89.5 |
| | STRONGLY AGREE | 34 | 10.2 | 10.5 | 100.0 |
| | Total | 325 | 97.9 | 100.0 | |
| Missing | System | 7 | 2.1 | | |
| Total | | 332 | 100.0 | | |

B3: I like to experiment with new ICT

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 1 | .3 | .3 | .3 |
| | DISAGREE | 15 | 4.5 | 4.5 | 4.8 |
| | UNDECIDED | 25 | 7.5 | 7.6 | 12.4 |
| | AGREE | 161 | 48.5 | 48.6 | 61.0 |
| | STRONGLY AGREE | 129 | 38.9 | 39.0 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

B4: I think ICT can decrease bureaucracy

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 16 | 4.8 | 4.9 | 4.9 |
| | DISAGREE | 46 | 13.9 | 14.0 | 18.8 |
| | UNDECIDED | 72 | 21.7 | 21.9 | 40.7 |
| | AGREE | 126 | 38.0 | 38.3 | 79.0 |
| | STRONGLY AGREE | 69 | 20.8 | 21.0 | 100.0 |
| | Total | 329 | 99.1 | 100.0 | |
| Missing | System | 3 | .9 | | |
| Total | | 332 | 100.0 | | |

B5: I think ICT can promote fulfilment at work

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 3 | .9 | .9 | .9 |
| | DISAGREE | 19 | 5.7 | 5.7 | 6.6 |
| | UNDECIDED | 39 | 11.7 | 11.7 | 18.4 |
| | AGREE | 174 | 52.4 | 52.4 | 70.8 |
| | STRONGLY AGREE | 97 | 29.2 | 29.2 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

B6: I think ICT can foster social development

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 7 | 2.1 | 2.1 | 2.1 |
| | DISAGREE | 34 | 10.2 | 10.2 | 12.3 |
| | UNDECIDED | 43 | 13.0 | 13.0 | 25.3 |
| | AGREE | 141 | 42.5 | 42.5 | 67.8 |
| | STRONGLY AGREE | 107 | 32.2 | 32.2 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

C1: I believe that top management in our organization supports the ICT app

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 5 | 1.5 | 1.5 | 1.5 |
| | DISAGREE | 25 | 7.5 | 7.6 | 9.1 |
| | UNDECIDED | 48 | 14.5 | 14.5 | 23.6 |
| | AGREE | 179 | 53.9 | 54.1 | 77.6 |
| | STRONGLY AGREE | 74 | 22.3 | 22.4 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

C2: Our organisation offers various types of ICT training programs

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 14 | 4.2 | 4.2 | 4.2 |
| | DISAGREE | 65 | 19.6 | 19.7 | 23.9 |
| | UNDECIDED | 52 | 15.7 | 15.8 | 39.7 |
| | AGREE | 142 | 42.8 | 43.0 | 82.7 |
| | STRONGLY AGREE | 57 | 17.2 | 17.3 | 100.0 |
| | Total | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

C3: The training programs conducted were job related

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 16 | 4.8 | 4.8 | 4.8 |
| | DISAGREE | 52 | 15.7 | 15.8 | 20.6 |
| | UNDECIDED | 55 | 16.6 | 16.7 | 37.3 |
| | AGREE | 159 | 47.9 | 48.2 | 85.5 |
| | STRONGLY AGREE | 48 | 14.5 | 14.5 | 100.0 |
| | Total | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

C4: Our organisation appraises ICT literacy of employees

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 78 | 23.5 | 23.6 | 23.6 |
| | DISAGREE | 119 | 35.8 | 36.0 | 59.5 |
| | UNDECIDED | 72 | 21.7 | 21.8 | 81.3 |
| | AGREE | 51 | 15.4 | 15.4 | 96.7 |
| | STRONGLY AGREE | 11 | 3.3 | 3.3 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

C5: Our organization evaluates the ICT applications that we work with regularly

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 38 | 11.4 | 11.5 | 11.5 |
| | DISAGREE | 93 | 28.0 | 28.2 | 39.7 |
| | UNDECIDED | 91 | 27.4 | 27.6 | 67.3 |
| | AGREE | 92 | 27.7 | 27.9 | 95.2 |
| | STRONGLY AGREE | 16 | 4.8 | 4.8 | 100.0 |
| | Total | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

C6: Our ICT service desk does a great job in answering ICT related problems

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 56 | 16.9 | 16.9 | 16.9 |
| | DISAGREE | 64 | 19.3 | 19.3 | 36.3 |
| | UNDECIDED | 104 | 31.3 | 31.4 | 67.7 |
| | AGREE | 80 | 24.1 | 24.2 | 91.8 |
| | STRONGLY AGREE | 27 | 8.1 | 8.2 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

D1: I am satisfied with the reliability of the system.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 21 | 6.3 | 6.3 | 6.3 |
| | DISAGREE | 51 | 15.4 | 15.4 | 21.7 |
| | UNDECIDED | 47 | 14.2 | 14.2 | 35.8 |
| | AGREE | 165 | 49.7 | 49.7 | 85.5 |
| | STRONGLY AGREE | 48 | 14.5 | 14.5 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

D2: I am satisfied with the system's ease of use.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 11 | 3.3 | 3.3 | 3.3 |
| | DISAGREE | 48 | 14.5 | 14.5 | 17.8 |
| | UNDECIDED | 46 | 13.9 | 13.9 | 31.6 |
| | AGREE | 174 | 52.4 | 52.4 | 84.0 |
| | STRONGLY AGREE | 53 | 16.0 | 16.0 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

D3: I am satisfied that the system is always accessible.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 27 | 8.1 | 8.2 | 8.2 |
| | DISAGREE | 78 | 23.5 | 23.6 | 31.7 |
| | UNDECIDED | 52 | 15.7 | 15.7 | 47.4 |
| | AGREE | 134 | 40.4 | 40.5 | 87.9 |
| | STRONGLY AGREE | 40 | 12.0 | 12.1 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

D4: I am satisfied with the system's packaged software.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 21 | 6.3 | 6.3 | 6.3 |
| | DISAGREE | 69 | 20.8 | 20.8 | 27.2 |
| | UNDECIDED | 87 | 26.2 | 26.3 | 53.5 |
| | AGREE | 123 | 37.0 | 37.2 | 90.6 |
| | STRONGLY AGREE | 31 | 9.3 | 9.4 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

D5: I am satisfied with the system's processing speed.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 49 | 14.8 | 14.8 | 14.8 |
| | DISAGREE | 95 | 28.6 | 28.6 | 43.4 |
| | UNDECIDED | 47 | 14.2 | 14.2 | 57.5 |
| | AGREE | 113 | 34.0 | 34.0 | 91.6 |
| | STRONGLY AGREE | 28 | 8.4 | 8.4 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

D6: I am satisfied with the system's network environment

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 26 | 7.8 | 7.8 | 7.8 |
| | DISAGREE | 74 | 22.3 | 22.3 | 30.1 |
| | UNDECIDED | 76 | 22.9 | 22.9 | 53.0 |
| | AGREE | 124 | 37.3 | 37.3 | 90.4 |
| | STRONGLY AGREE | 32 | 9.6 | 9.6 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

E1: I believe using ICT provided me with information that is useful

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 38 | 11.4 | 11.4 | 14.2 |
| | UNDECIDED | 38 | 11.4 | 11.4 | 25.6 |
| | AGREE | 185 | 55.7 | 55.7 | 81.3 |
| | STRONGLY AGREE | 62 | 18.7 | 18.7 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

E2: I believe using ICT provided me with information that is accurate

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 8 | 2.4 | 2.4 | 2.4 |
| | DISAGREE | 29 | 8.7 | 8.7 | 11.1 |
| | UNDECIDED | 57 | 17.2 | 17.2 | 28.3 |
| | AGREE | 183 | 55.1 | 55.1 | 83.4 |
| | STRONGLY AGREE | 55 | 16.6 | 16.6 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

E3: I believe using ICT provided me with information at the right time

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 40 | 12.0 | 12.0 | 14.8 |
| | UNDECIDED | 64 | 19.3 | 19.3 | 34.0 |
| | AGREE | 165 | 49.7 | 49.7 | 83.7 |
| | STRONGLY AGREE | 54 | 16.3 | 16.3 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

E4: I believe our IT personnel understand our business functions

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 19 | 5.7 | 5.7 | 5.7 |
| | DISAGREE | 66 | 19.9 | 19.9 | 25.7 |
| | UNDECIDED | 107 | 32.2 | 32.3 | 58.0 |
| | AGREE | 103 | 31.0 | 31.1 | 89.1 |
| | STRONGLY AGREE | 36 | 10.8 | 10.9 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

E5: I believe our IT personnel understand the organisation's policies and laws

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 27 | 8.1 | 8.2 | 8.2 |
| | DISAGREE | 55 | 16.6 | 16.7 | 24.8 |
| | UNDECIDED | 115 | 34.6 | 34.8 | 59.7 |
| | AGREE | 108 | 32.5 | 32.7 | 92.4 |
| | STRONGLY AGREE | 25 | 7.5 | 7.6 | 100.0 |
| | Total | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

E6: I believe our IT personnel are free to assist users when needed

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 19 | 5.7 | 5.7 | 5.7 |
| | DISAGREE | 61 | 18.4 | 18.4 | 24.1 |
| | UNDECIDED | 98 | 29.5 | 29.5 | 53.6 |
| | AGREE | 126 | 38.0 | 38.0 | 91.6 |
| | STRONGLY AGREE | 28 | 8.4 | 8.4 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

F1: After deploying ICTs at work, our transparency had improved

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 17 | 5.1 | 5.1 | 5.1 |
| | DISAGREE | 46 | 13.9 | 13.9 | 19.0 |
| | UNDECIDED | 84 | 25.3 | 25.3 | 44.3 |
| | AGREE | 144 | 43.4 | 43.4 | 87.7 |
| | STRONGLY AGREE | 41 | 12.3 | 12.3 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

F2: After deploying ICTs at work, we can increase public participation

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 14 | 4.2 | 4.3 | 4.3 |
| | DISAGREE | 57 | 17.2 | 17.4 | 21.6 |
| | UNDECIDED | 80 | 24.1 | 24.4 | 46.0 |
| | AGREE | 143 | 43.1 | 43.6 | 89.6 |
| | STRONGLY AGREE | 34 | 10.2 | 10.4 | 100.0 |
| | Total | 328 | 98.8 | 100.0 | |
| Missing | System | 4 | 1.2 | | |
| Total | | 332 | 100.0 | | |

F3: The Ministry of Finance's website has good information about all tax procedures

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 33 | 9.9 | 10.1 | 12.8 |
| | UNDECIDED | 83 | 25.0 | 25.3 | 38.1 |
| | AGREE | 163 | 49.1 | 49.7 | 87.8 |
| | STRONGLY AGREE | 40 | 12.0 | 12.2 | 100.0 |
| | Total | 328 | 98.8 | 100.0 | |
| Missing | System | 4 | 1.2 | | |
| Total | | 332 | 100.0 | | |

F4: After deploying ICTs at work, we can service customers much faster

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 6 | 1.8 | 1.8 | 1.8 |
| | DISAGREE | 29 | 8.7 | 8.7 | 10.5 |
| | UNDECIDED | 48 | 14.5 | 14.5 | 25.0 |
| | AGREE | 174 | 52.4 | 52.4 | 77.4 |
| | STRONGLY AGREE | 75 | 22.6 | 22.6 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

F5: After deploying ICTs at work, we can deliver tailored services to citizens

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 6 | 1.8 | 1.8 | 1.8 |
| | DISAGREE | 34 | 10.2 | 10.3 | 12.2 |
| | UNDECIDED | 73 | 22.0 | 22.2 | 34.3 |
| | AGREE | 171 | 51.5 | 52.0 | 86.3 |
| | STRONGLY AGREE | 45 | 13.6 | 13.7 | 100.0 |
| | Total | 329 | 99.1 | 100.0 | |
| Missing | System | 3 | .9 | | |
| Total | | 332 | 100.0 | | |

G1: I believe ICT increased job productivity

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 5 | 1.5 | 1.5 | 1.5 |
| | DISAGREE | 37 | 11.1 | 11.1 | 12.7 |
| | UNDECIDED | 48 | 14.5 | 14.5 | 27.1 |
| | AGREE | 180 | 54.2 | 54.2 | 81.3 |
| | STRONGLY AGREE | 62 | 18.7 | 18.7 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

G2: I believe ICT enabled me to do my job more quickly.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 24 | 7.2 | 7.3 | 10.0 |
| | UNDECIDED | 43 | 13.0 | 13.0 | 23.0 |
| | AGREE | 194 | 58.4 | 58.6 | 81.6 |
| | STRONGLY AGREE | 61 | 18.4 | 18.4 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

G3: I believe ICT improved my judgment at work

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 13 | 3.9 | 3.9 | 3.9 |
| | DISAGREE | 53 | 16.0 | 16.0 | 19.9 |
| | UNDECIDED | 69 | 20.8 | 20.8 | 40.8 |
| | AGREE | 160 | 48.2 | 48.3 | 89.1 |
| | STRONGLY AGREE | 36 | 10.8 | 10.9 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

G4: I believe ICT reduced our interaction with citizens due to the web offered services

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 34 | 10.2 | 10.4 | 10.4 |
| | DISAGREE | 79 | 23.8 | 24.1 | 34.5 |
| | UNDECIDED | 100 | 30.1 | 30.5 | 64.9 |
| | AGREE | 96 | 28.9 | 29.3 | 94.2 |
| | STRONGLY AGREE | 19 | 5.7 | 5.8 | 100.0 |
| | Total | 328 | 98.8 | 100.0 | |
| Missing | System | 4 | 1.2 | | |
| Total | | 332 | 100.0 | | |

G5: The web information reduced my work as a tax advisor

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 46 | 13.9 | 14.0 | 14.0 |
| | DISAGREE | 81 | 24.4 | 24.6 | 38.6 |
| | UNDECIDED | 104 | 31.3 | 31.6 | 70.2 |
| | AGREE | 83 | 25.0 | 25.2 | 95.4 |
| | STRONGLY AGREE | 15 | 4.5 | 4.6 | 100.0 |
| | Total | 329 | 99.1 | 100.0 | |
| Missing | System | 3 | .9 | | |
| Total | | 332 | 100.0 | | |

G6: Putting all the tax material on the web was a good taxpayer teaching tool

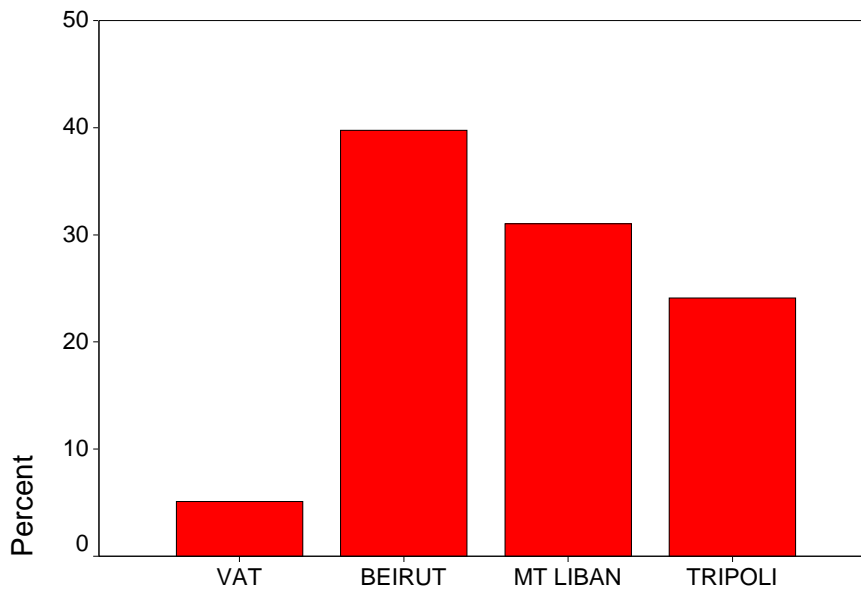
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 22 | 6.6 | 6.6 | 6.6 |
| | DISAGREE | 61 | 18.4 | 18.4 | 25.1 |
| | UNDECIDED | 113 | 34.0 | 34.1 | 59.2 |
| | AGREE | 113 | 34.0 | 34.1 | 93.4 |
| | STRONGLY AGREE | 22 | 6.6 | 6.6 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

G7: I believe ICT has reduced my overall work load

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 29 | 8.7 | 8.9 | 8.9 |
| | DISAGREE | 80 | 24.1 | 24.5 | 33.3 |
| | UNDECIDED | 72 | 21.7 | 22.0 | 55.4 |
| | AGREE | 122 | 36.7 | 37.3 | 92.7 |
| | STRONGLY AGREE | 24 | 7.2 | 7.3 | 100.0 |
| | Total | 327 | 98.5 | 100.0 | |
| Missing | System | 5 | 1.5 | | |
| Total | | 332 | 100.0 | | |

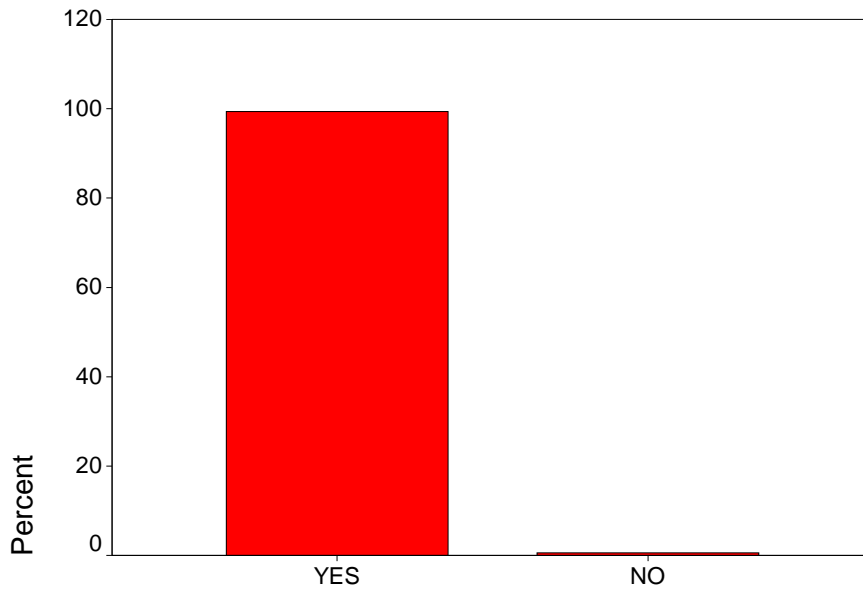
Bar Chart

A1: Which revenue directorate building do you



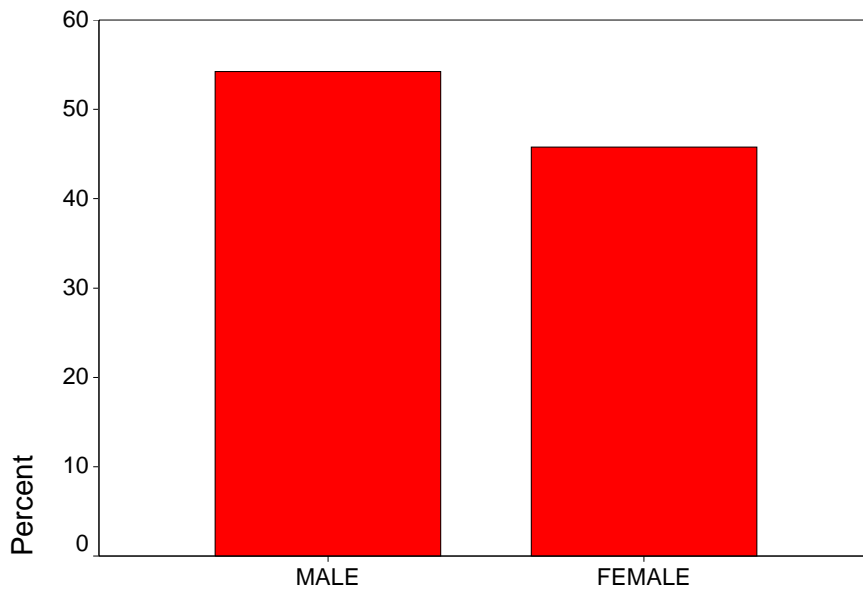
A1: Which revenue directorate building do you work at?

A2: Do you use a computer at work?



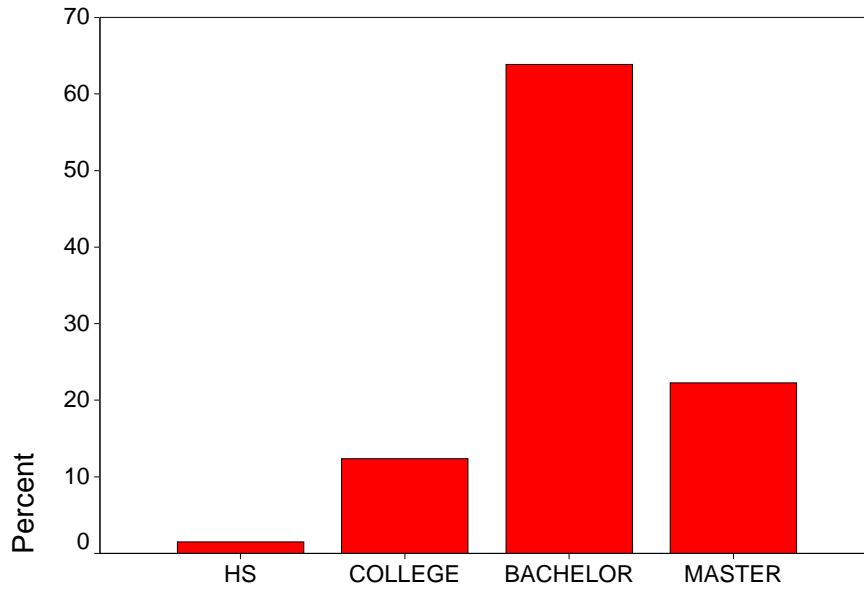
A2: Do you use a computer at work?

A3: What is your gender?



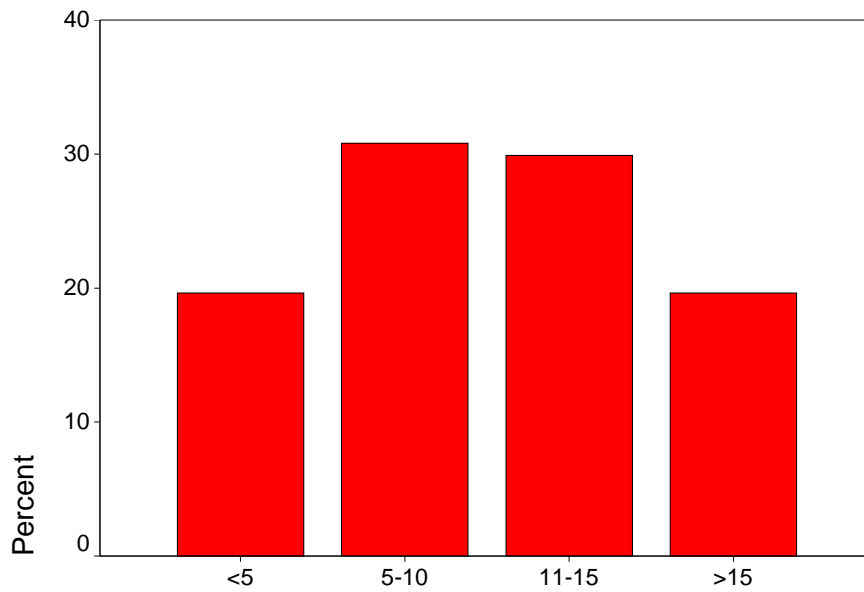
A3: What is your gender?

A4:What is your level of education?



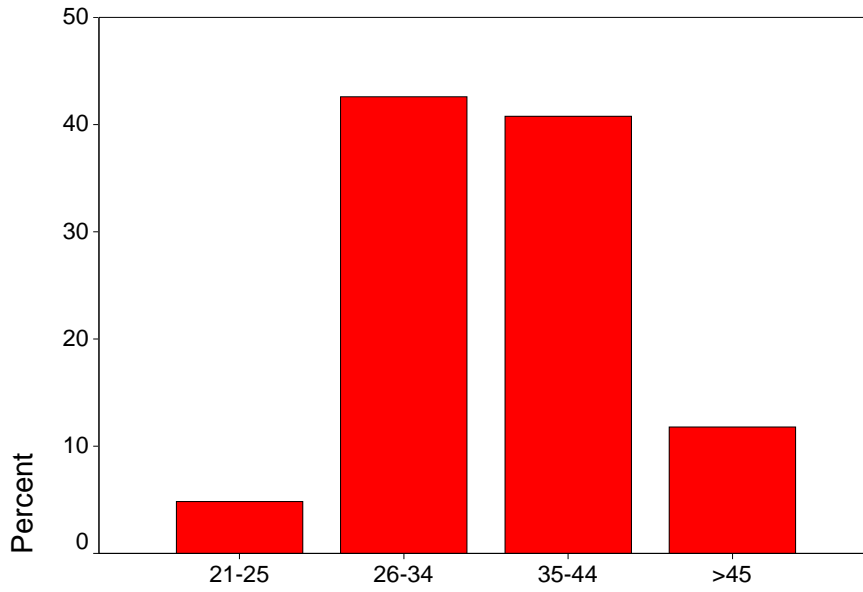
A4:What is your level of education?

A5: Tenure in years?



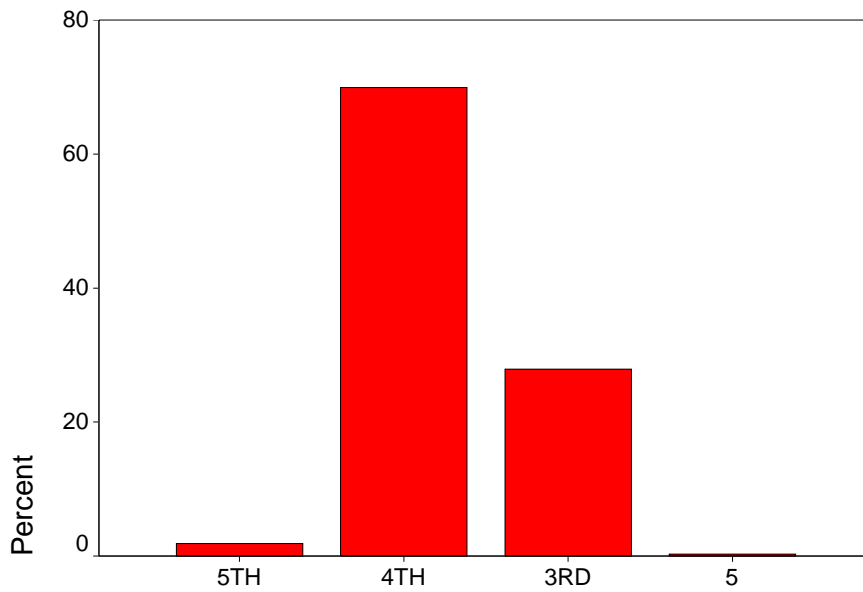
A5: Tenure in years?

A6: Your age?



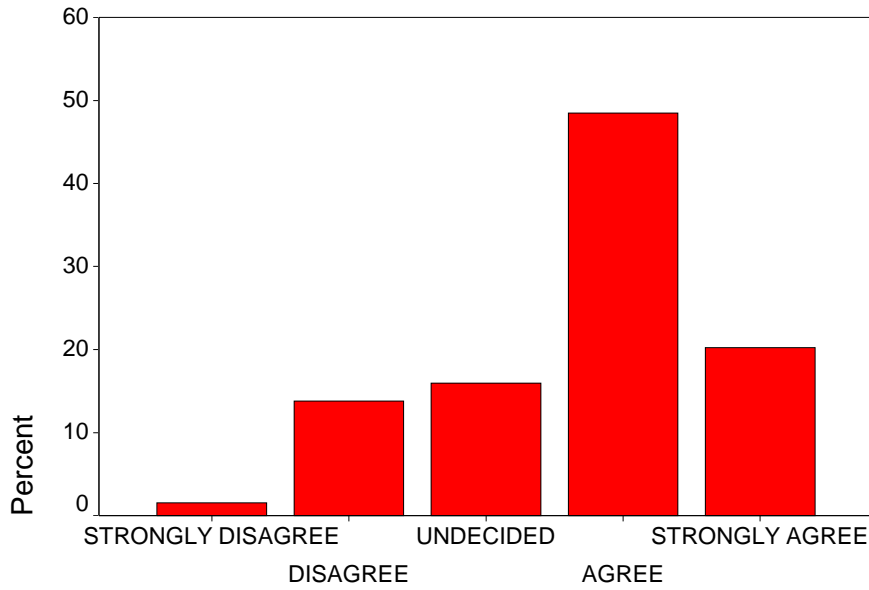
A6: Your age?

A7: Your grade level at the organisation?



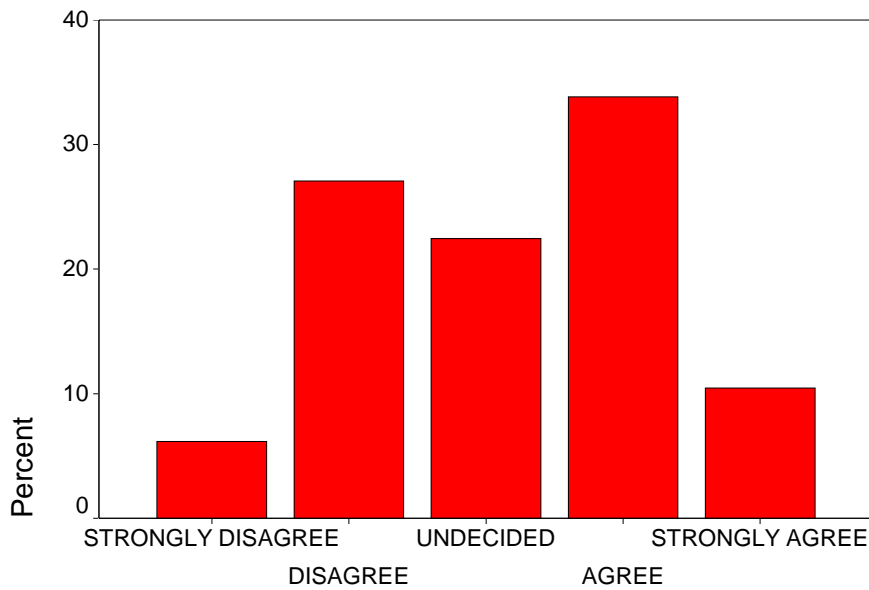
A7: Your grade level at the organisation?

B1: If I heard about a new information technology,



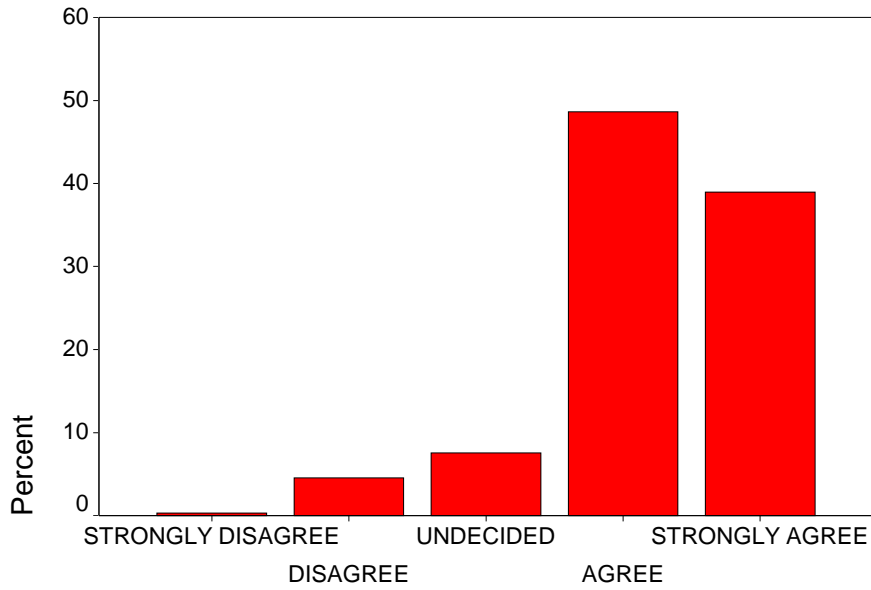
B1: If I heard about a new information technology, I would look

B2: Among my peers, I am usually the first to



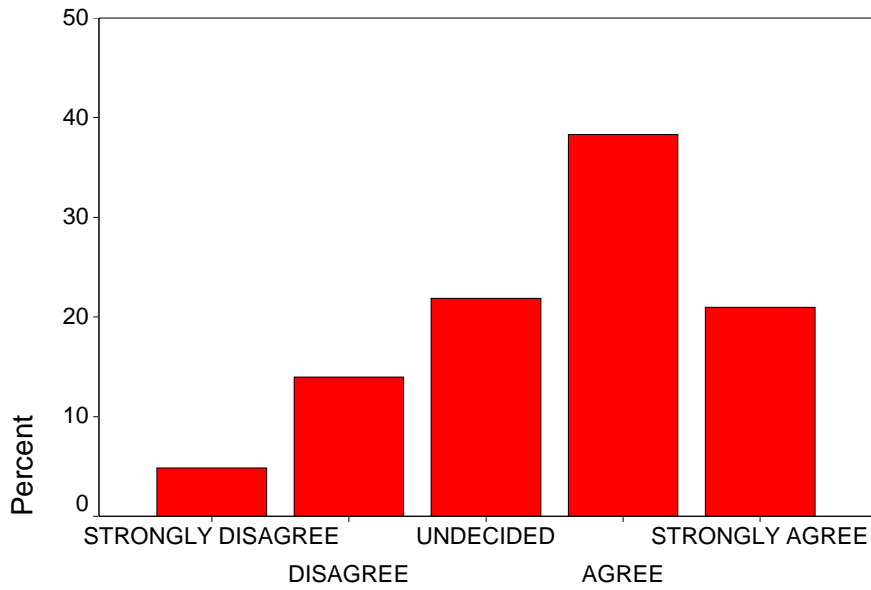
B2: Among my peers, I am usually the first to try out new infor

B3: I like to experiment with new ICT



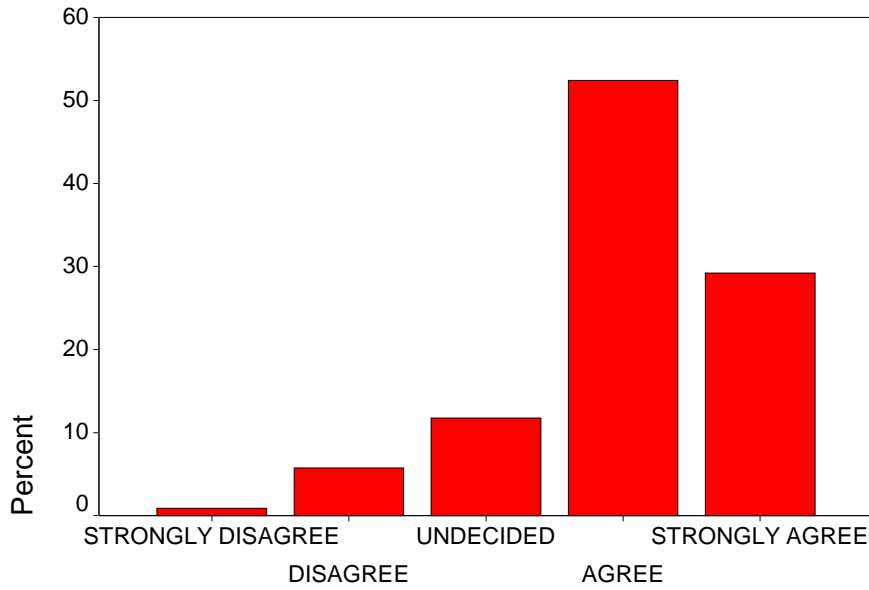
B3: I like to experiment with new ICT

B4: I think ICT can decrease bureaucracy



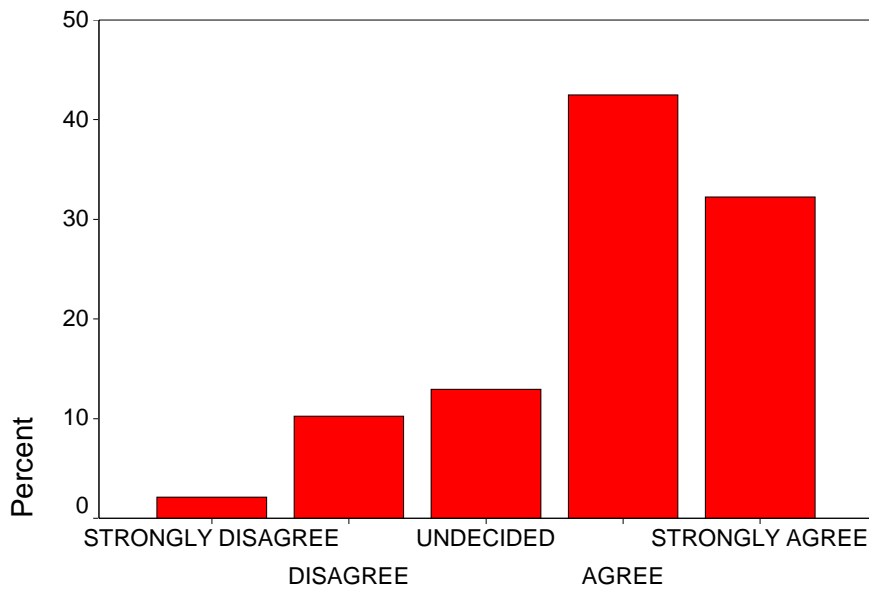
B4: I think ICT can decrease bureaucracy

B5: I think ICT can promote fulfilment at wor



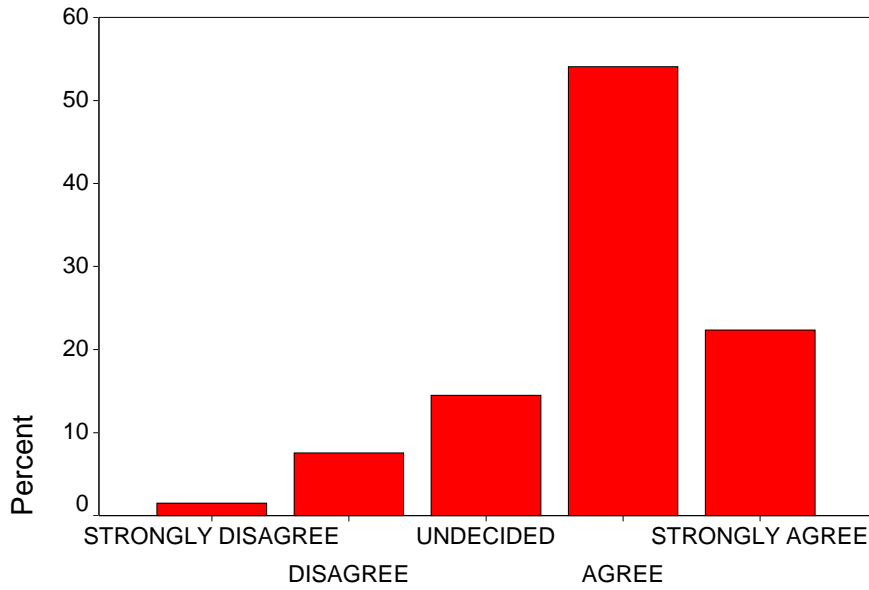
B5: I think ICT can promote fulfilment at work

B6: I think ICT can foster social developmen



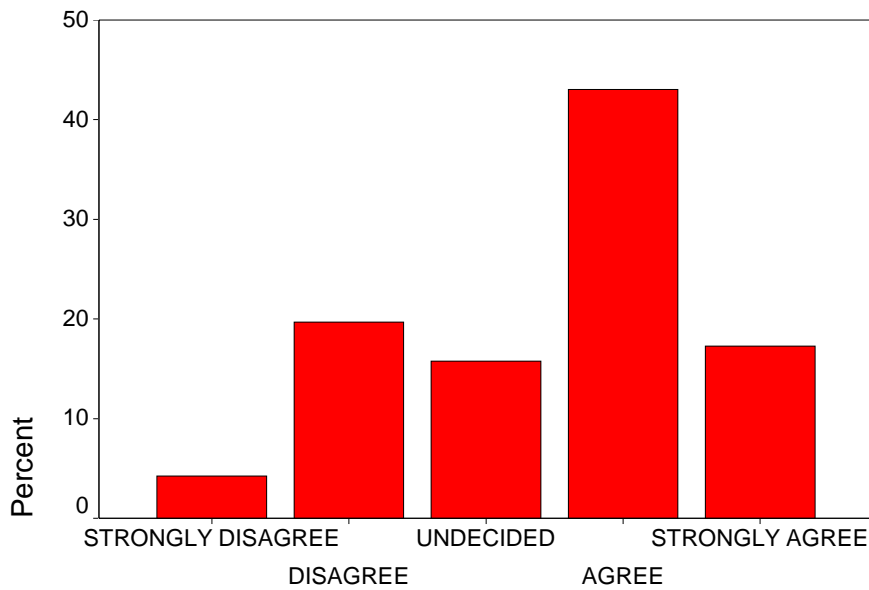
B6: I think ICT can foster social development

C1: I believe that top management in our org



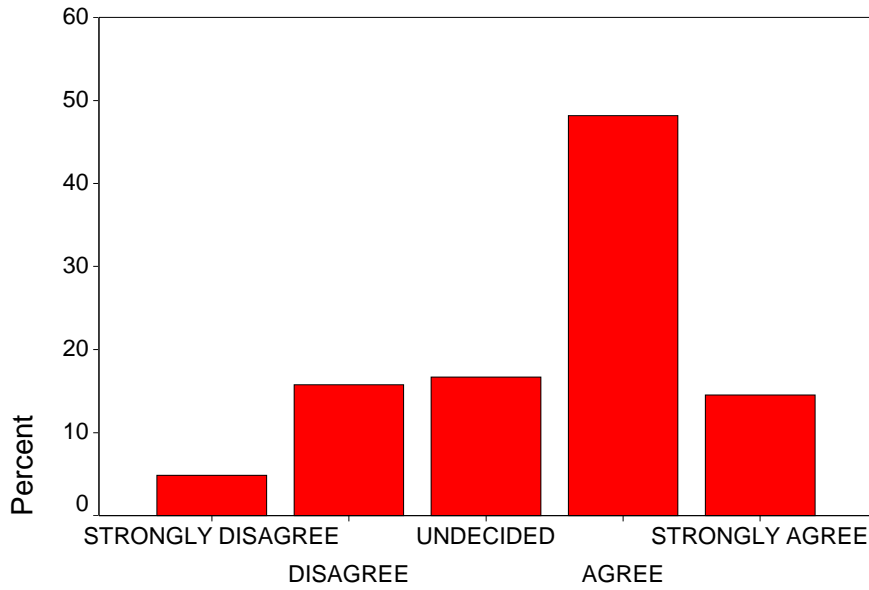
C1: I believe that top management in our organization support

C2: Our organisation offers various types of



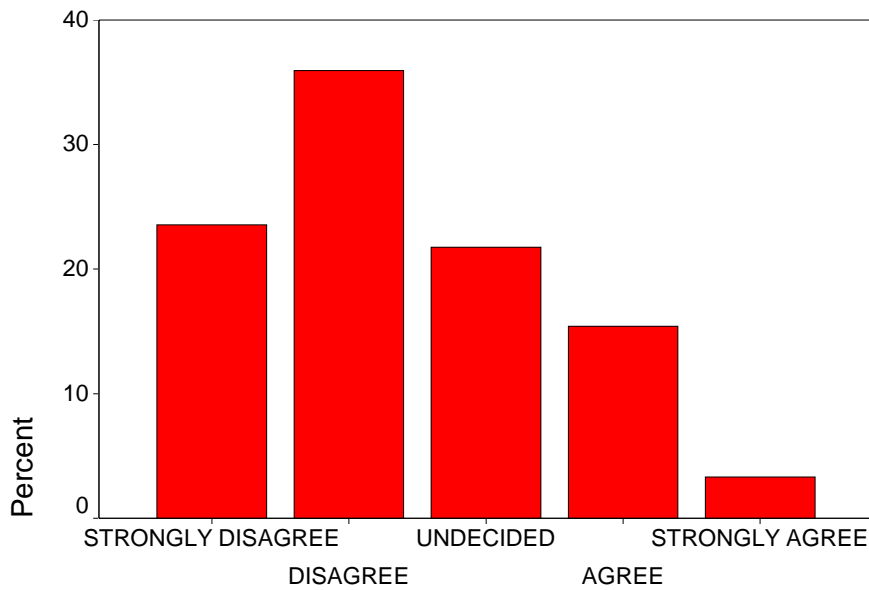
C2: Our organisation offers various types of ICT training progr

C3: The training programs conducted were j



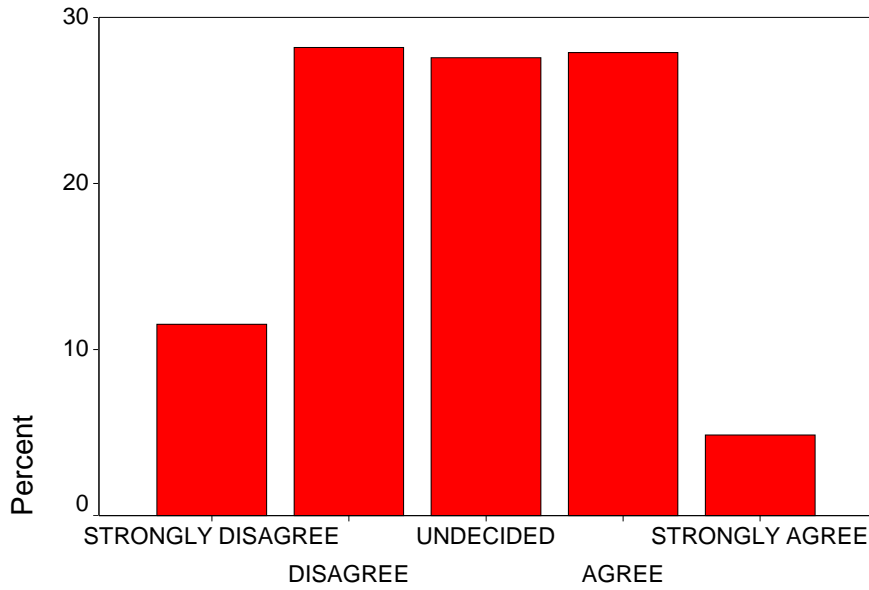
C3: The training programs conducted were job related

C4: Our organisation appraises ICT literacy



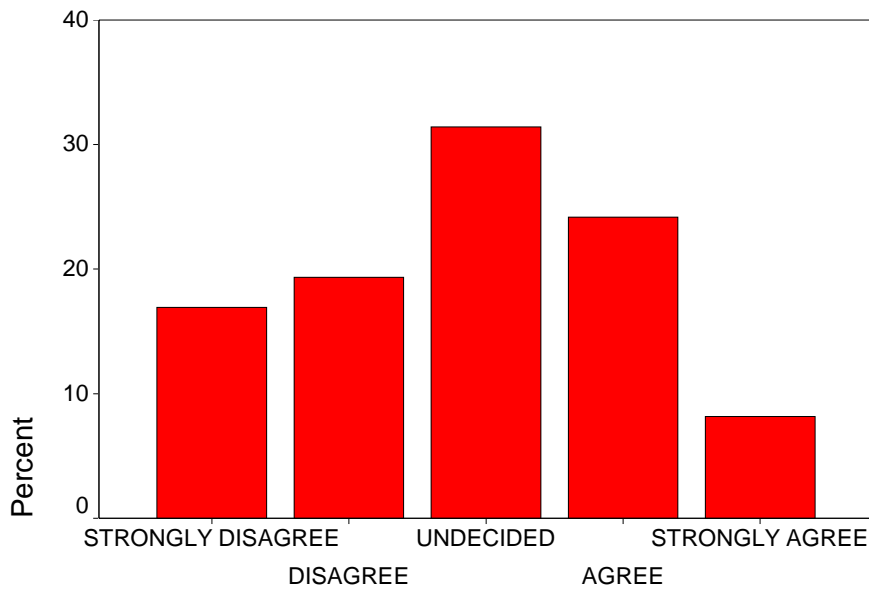
C4: Our organisation appraises ICT literacy of employees

C5: Our organization evaluates the ICT appl



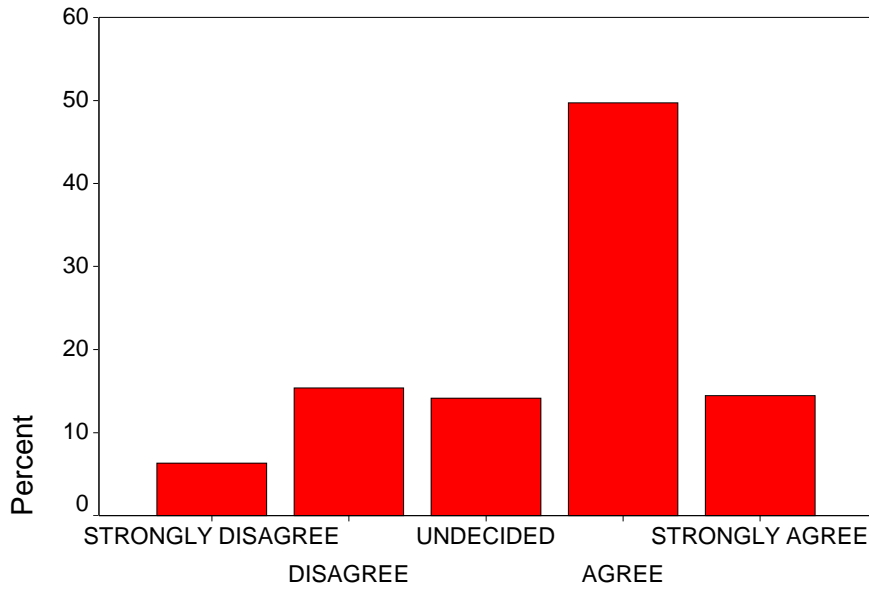
C5: Our organization evaluates the ICT applications that we w

C6: Our ICT service desk does a great job in



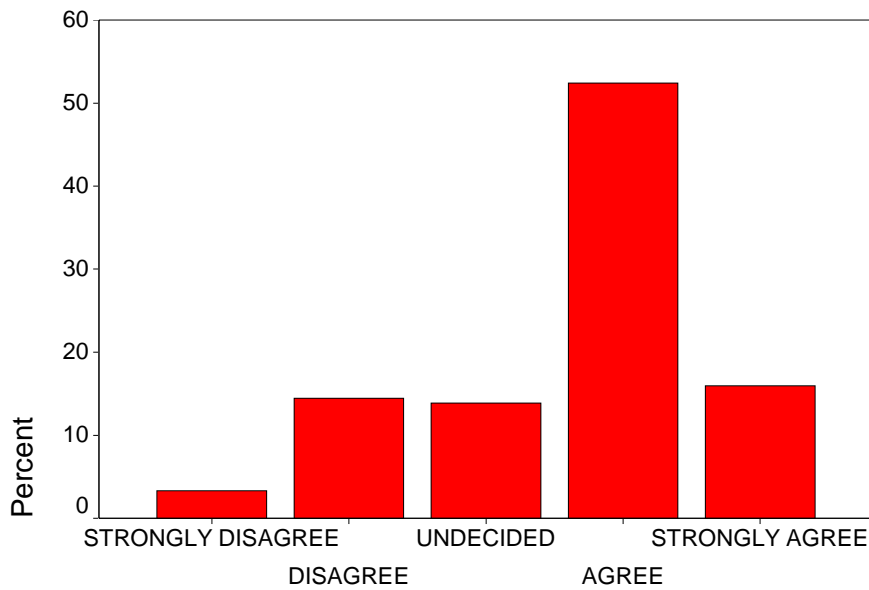
C6: Our ICT service desk does a great job in answering ICT r

D1: I am satisfied with the reliability of the sy



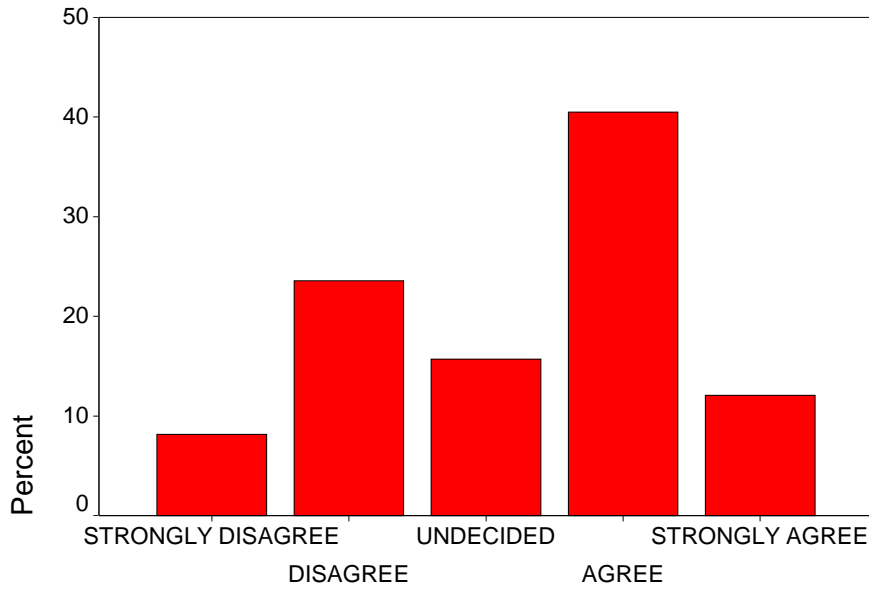
D1: I am satisfied with the reliability of the system.

D2: I am satisfied with the system's ease of



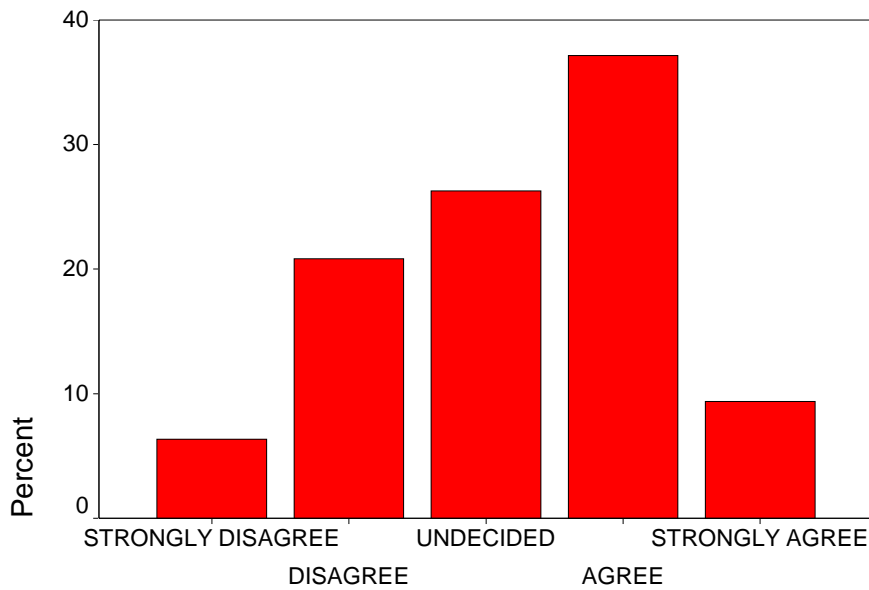
D2: I am satisfied with the system's ease of use.

D3: I am satisfied that the system is always accessible.



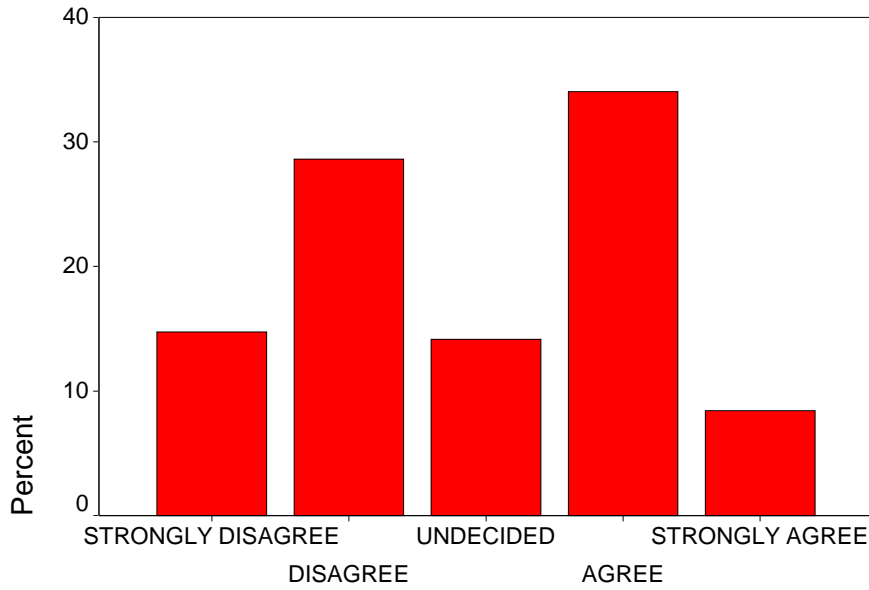
D3: I am satisfied that the system is always accessible.

D4: I am satisfied with the system's packaged software.



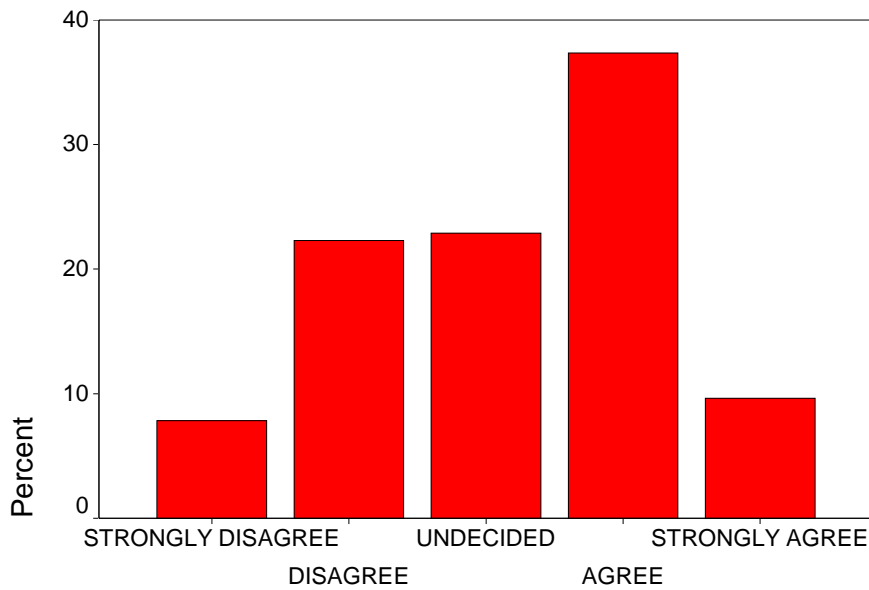
D4: I am satisfied with the system's packaged software.

D5: I am satisfied with the system's processi



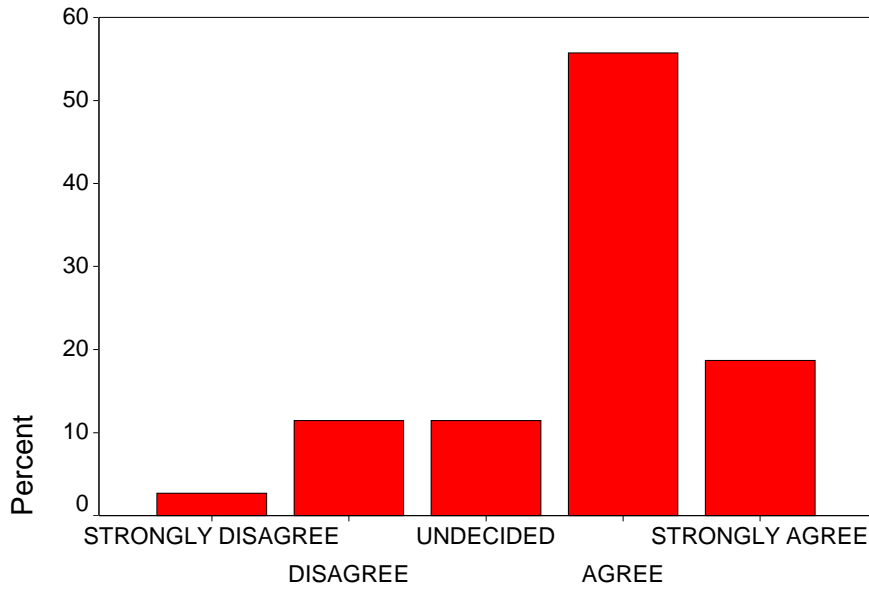
D5: I am satisfied with the system's processing speed.

D6: I am satisfied with the system's network



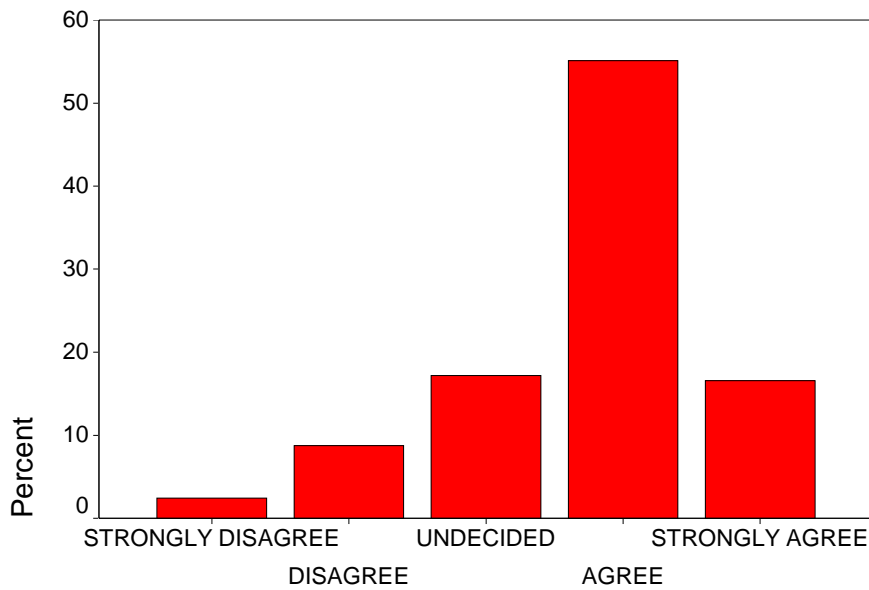
D6: I am satisfied with the system's network environment

E1: I believe using ICT provided me with info



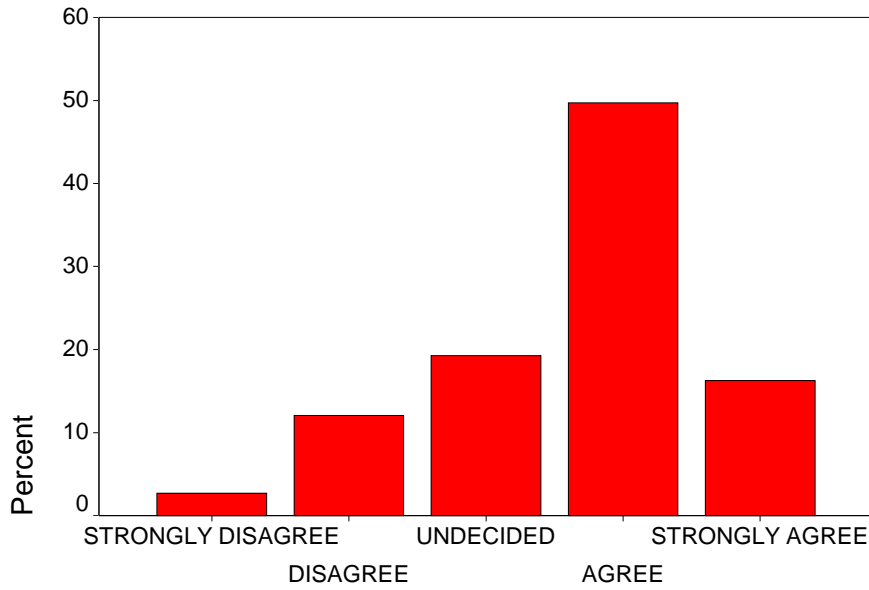
E1: I believe using ICT provided me with information that is us

E2: I believe using ICT provided me with info



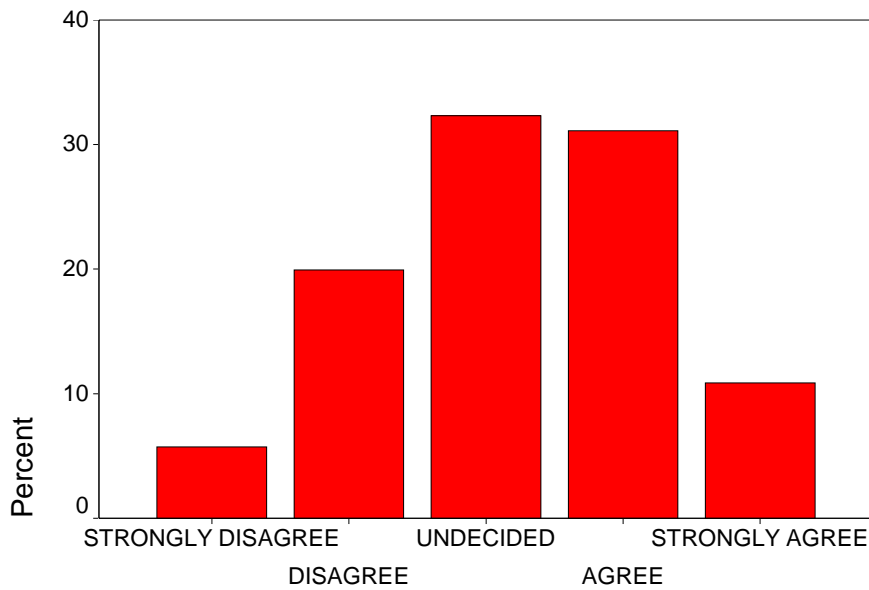
E2: I believe using ICT provided me with information that is ac

E3: I believe using ICT provided me with info



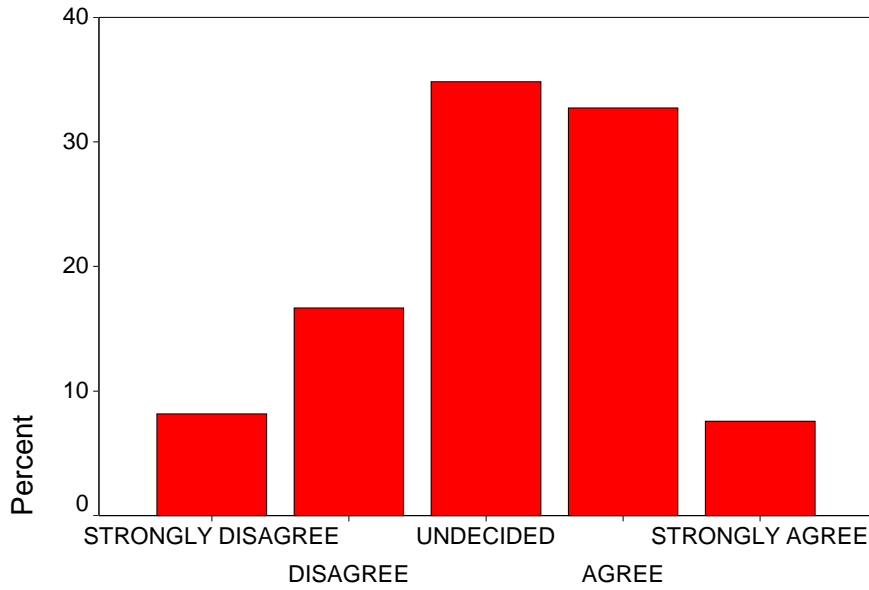
E3: I believe using ICT provided me with information at the rig

E4: I believe our IT personnel understand our



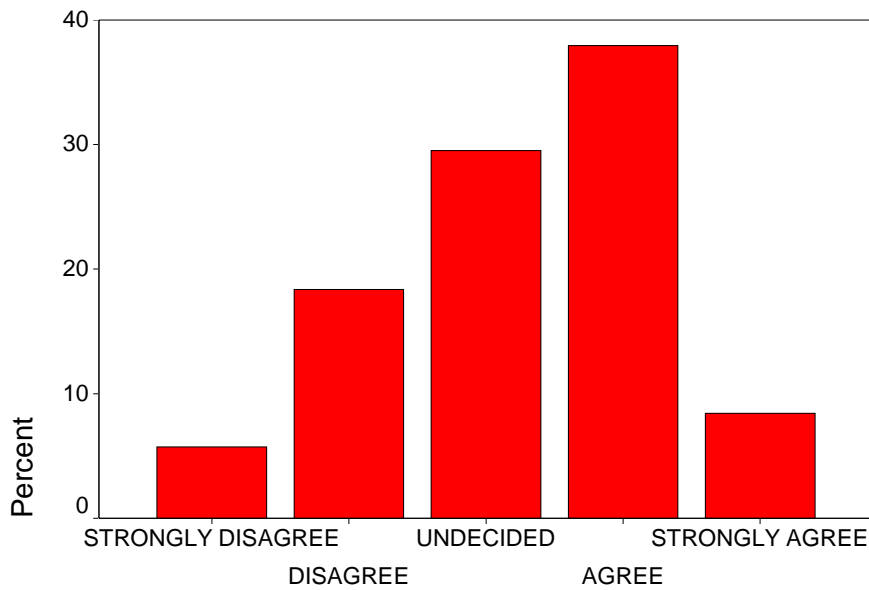
E4: I believe our IT personnel understand our business func

E5: I believe our IT personnel understand th



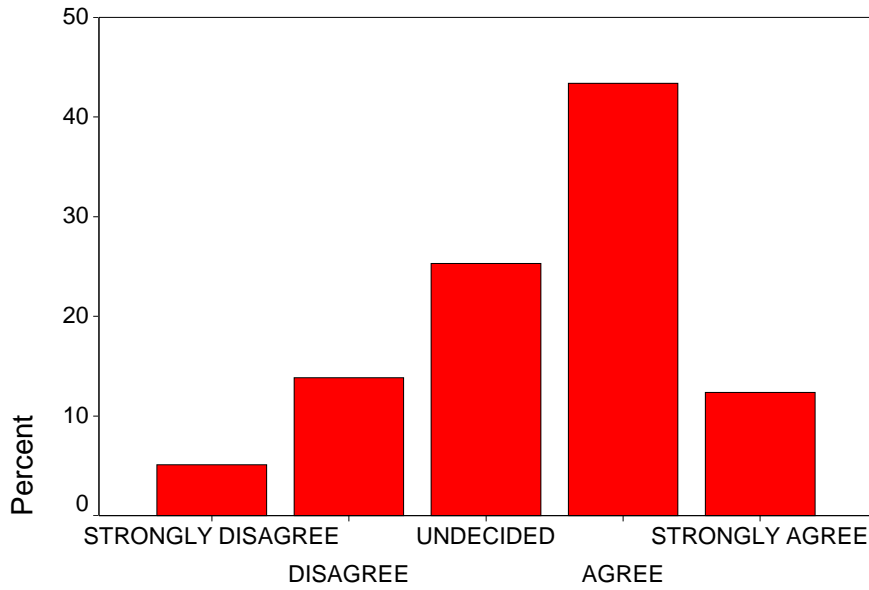
E5: I believe our IT personnel understand the organisation's p

E6: I believe our IT personnel are free to ass



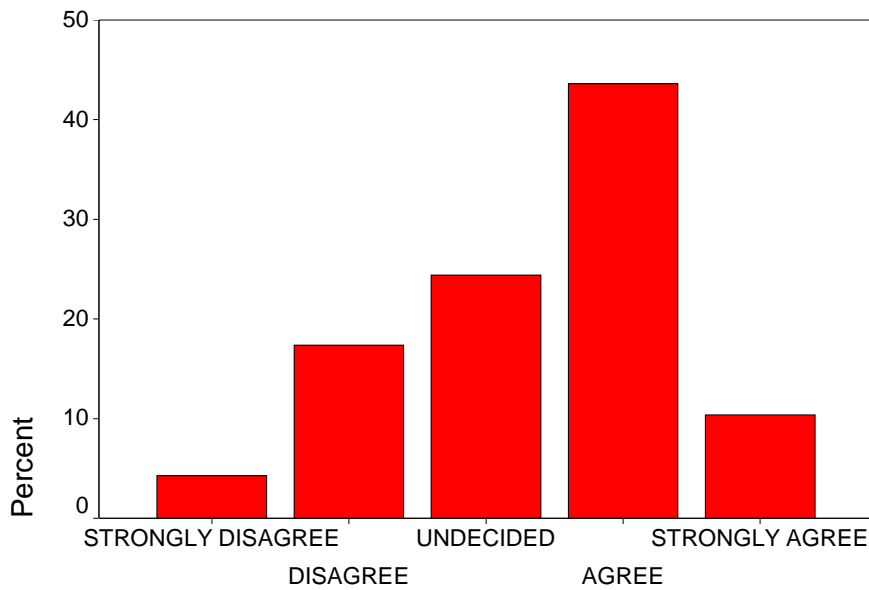
E6: I believe our IT personnel are free to assist users when ne

F1: After deploying ICTs at work, our transparency had improved



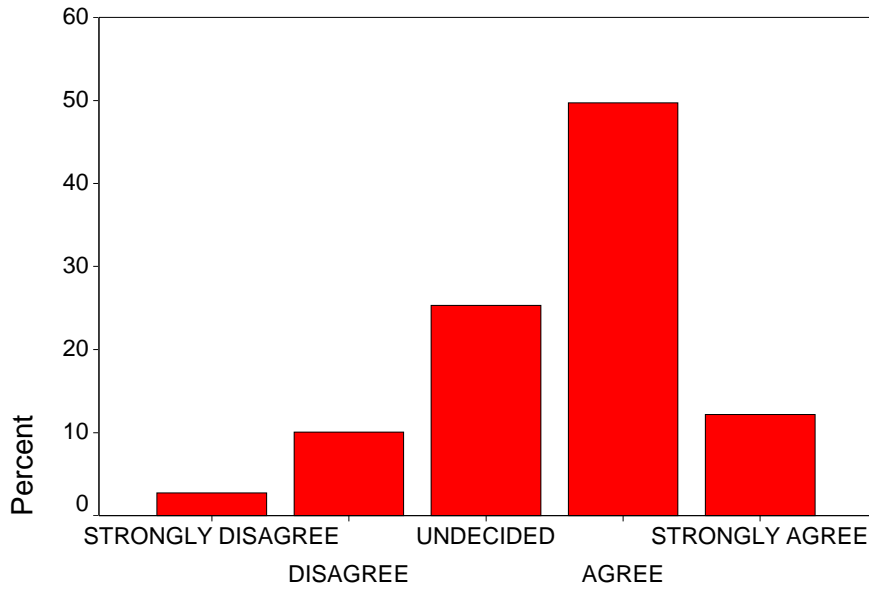
F1: After deploying ICTs at work, our transparency had improved

F2: After deploying ICTs at work, we can increase public participation



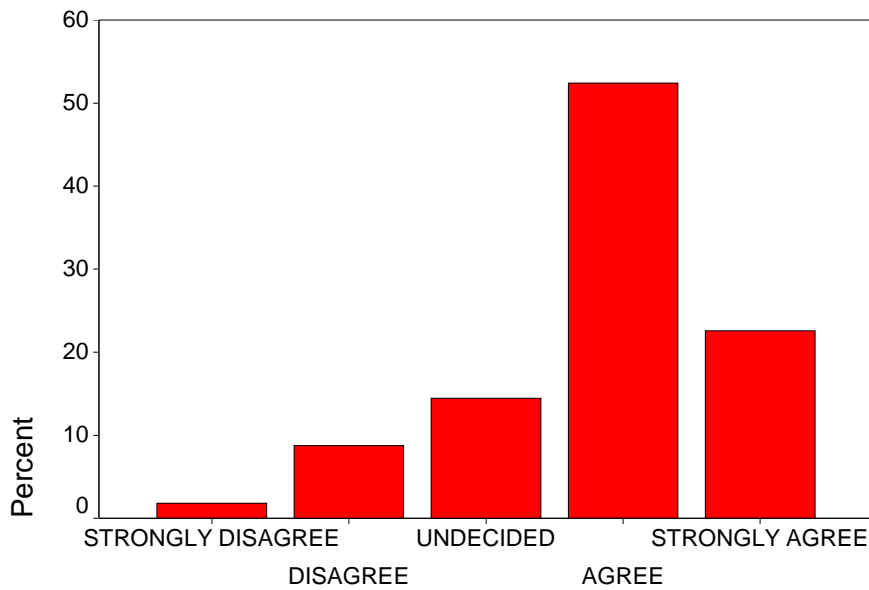
F2: After deploying ICTs at work, we can increase public participation

F3: The Ministry of Finance's website has good information ab



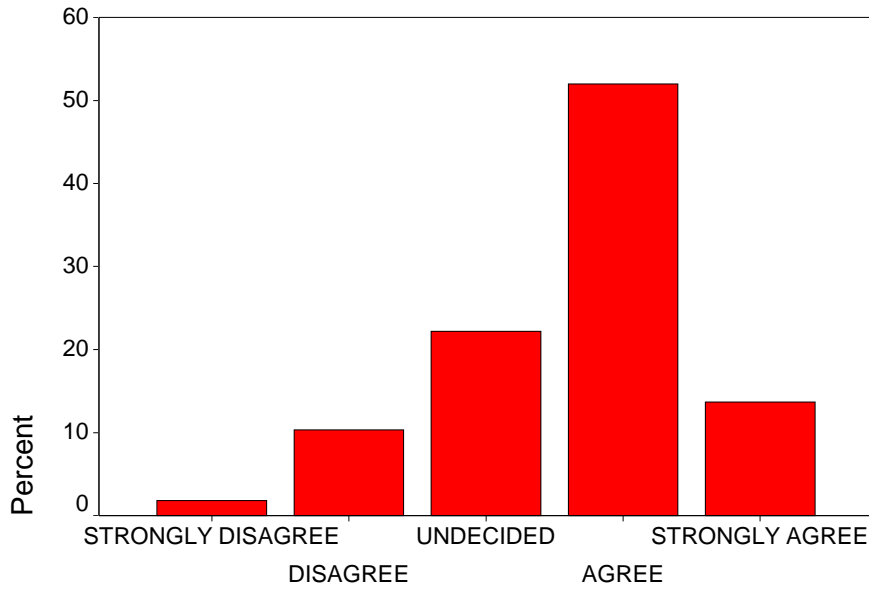
F3: The Ministry of Finance's website has good information ab

F4: After deploying ICTs at work, we can sei



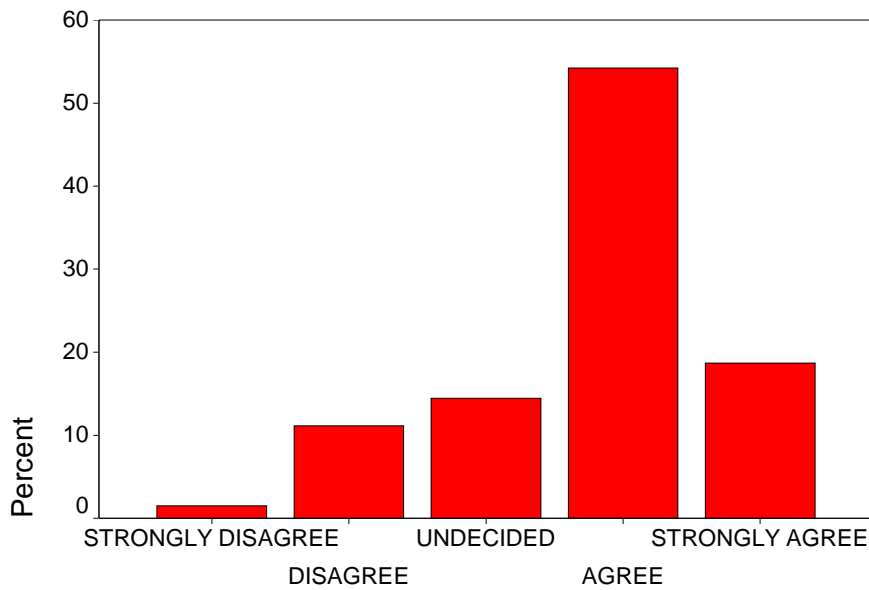
F4: After deploying ICTs at work, we can service customers m

F5: After deploying ICTs at work, we can del



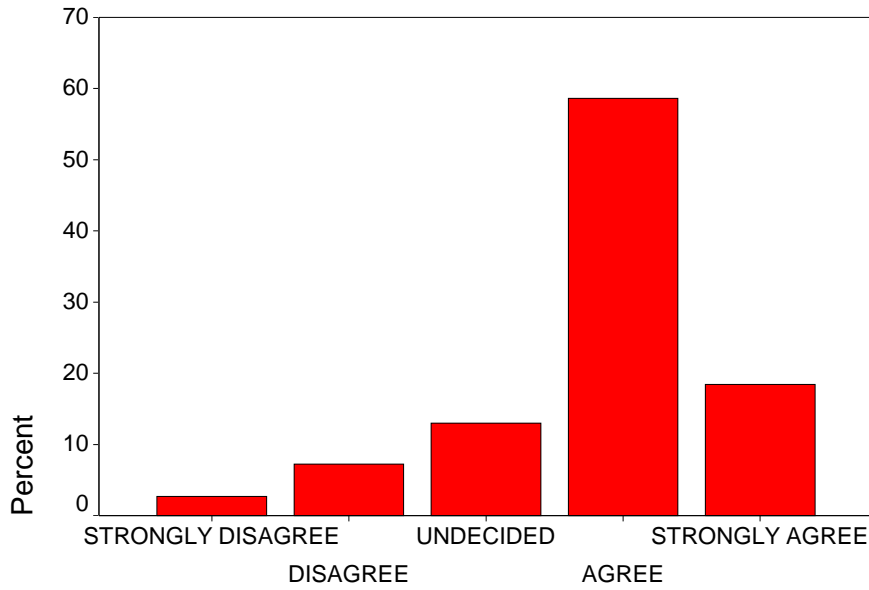
F5: After deploying ICTs at work, we can deliver tailored services

G1: I believe ICT increased job productivity



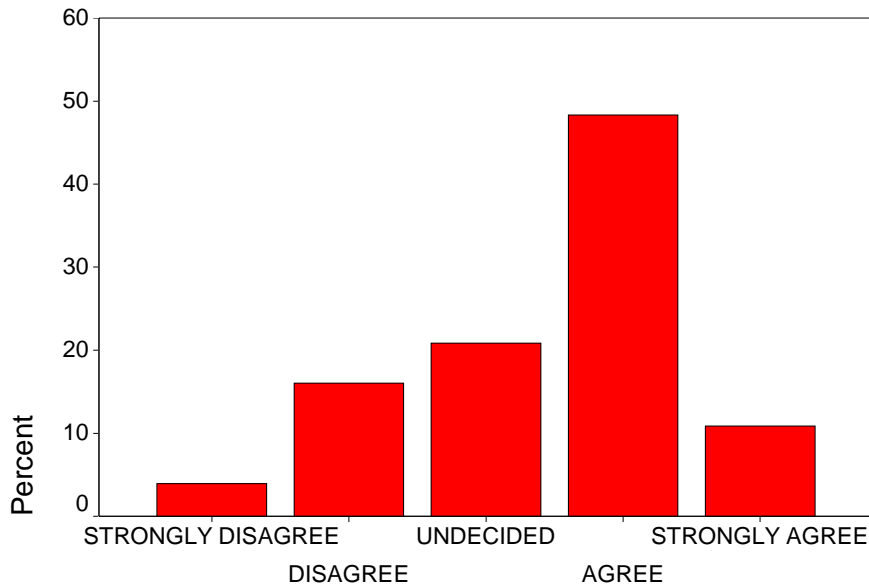
G1: I believe ICT increased job productivity

G2: I believe ICT enabled me to do my job n



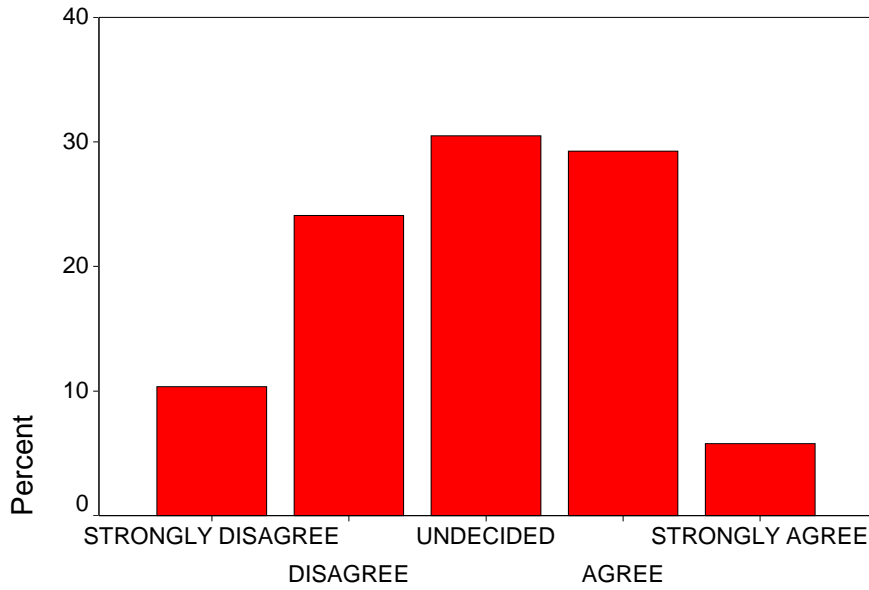
G2: I believe ICT enabled me to do my job more quickly.

G3: I believe ICT improved my judgment at work



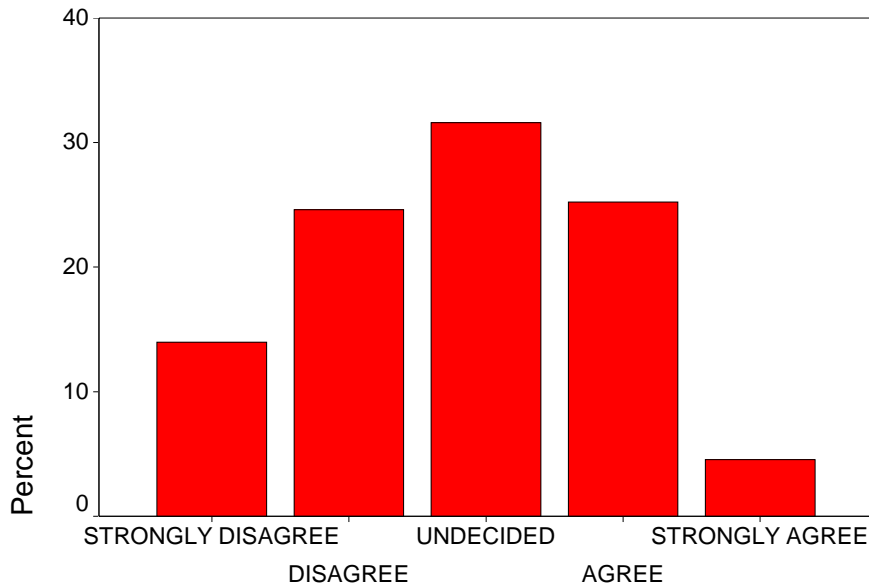
G3: I believe ICT improved my judgment at work

G4: I believe ICT reduced our interaction with



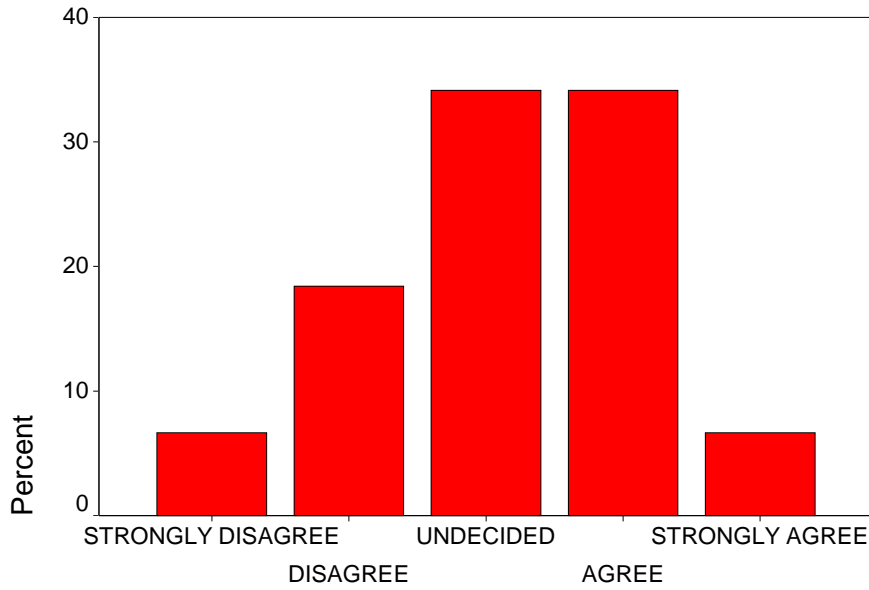
G4: I believe ICT reduced our interaction with citizens due to t

G5: The web information reduced my work as a



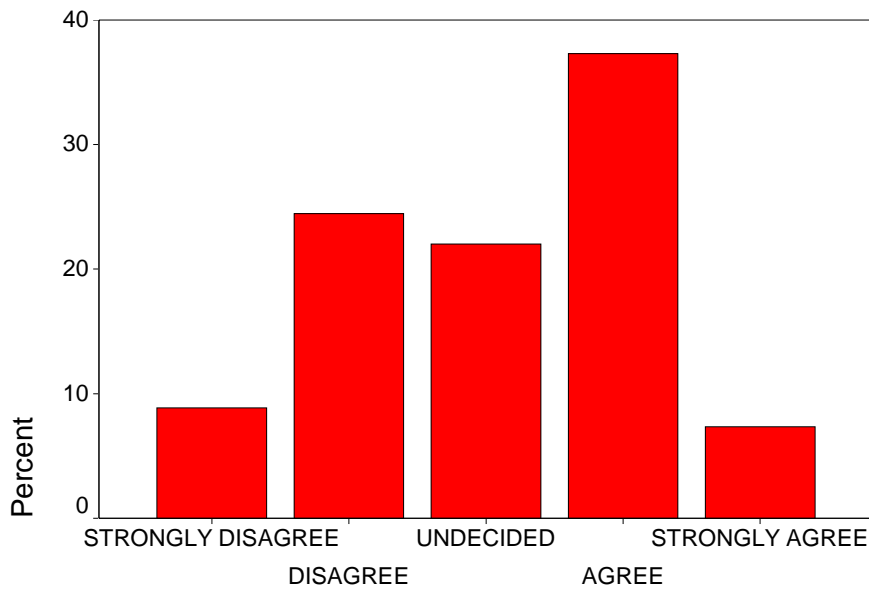
G5: The web information reduced my work as a tax advisor

G6: Putting all the tax material on the web w



G6: Putting all the tax material on the web was a good taxpaye

G7: I believe ICT has reduced my overall wc



G7: I believe ICT has reduced my overall work load

APPENDIX SPSS

2

CRONBACH'S ALPHA OUTPUT

Reliability

***** Method 1 (space saver) will be used for this analysis *****

RELIABILITY ANALYSIS - SCALE (ALPHA)

| Statistics for | Mean | Variance | Std Dev | N of Variables |
|----------------|---------|----------|---------|----------------|
| SCALE | 22.6435 | 13.3947 | 3.6599 | 6 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Alpha if Item Deleted |
|----|----------------------------|--------------------------------|----------------------------------|-----------------------|
| B1 | 18.9274 | 9.4093 | .5073 | .6136 |
| B2 | 19.4858 | 9.1367 | .4460 | .6352 |
| B3 | 18.4196 | 10.2316 | .5223 | .6209 |
| B4 | 19.0757 | 10.2727 | .2637 | .7023 |
| B5 | 18.5962 | 10.3491 | .4403 | .6400 |
| B6 | 18.7129 | 9.9205 | .3856 | .6552 |

Reliability Coefficients

N of Cases = 317.0 N of Items = 6
Alpha = .6857

Reliability

***** Method 1 (space saver) will be used for this analysis *****

RELIABILITY ANALYSIS - SCALE (ALPHA)

| Statistics for | Mean | Variance | Std Dev | N of Variables |
|----------------|---------|----------|---------|----------------|
| SCALE | 19.0408 | 10.5927 | 3.2546 | 5 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Alpha if Item Deleted |
|----|----------------------------|--------------------------------|----------------------------------|-----------------------|
| B1 | 15.3292 | 6.7813 | .5616 | .6247 |
| B2 | 15.8871 | 6.8237 | .4334 | .6856 |
| B3 | 14.8245 | 7.6672 | .5394 | .6456 |
| B5 | 15.0031 | 7.7830 | .4437 | .6750 |
| B6 | 15.1191 | 7.2814 | .4123 | .6892 |

Reliability Coefficients

N of Cases = 319.0

N of Items = 5

Alpha = .7121

Reliability

***** Method 1 (space saver) will be used for this analysis *****

RELIABILITY ANALYSIS - SCALE (ALPHA)

| Statistics for | Mean | Variance | Std Dev | N of |
|----------------|---------|----------|---------|----------------|
| SCALE | 19.0123 | 22.0494 | 4.6957 | Variables 6 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item- Total Correlation | Alpha if Item Deleted |
|----|-------------------------------------|---|--|-----------------------------|
| C1 | 15.1420 | 17.3110 | .5289 | .8014 |
| C2 | 15.5062 | 15.2476 | .6390 | .7769 |
| C3 | 15.4907 | 15.6439 | .6203 | .7814 |
| C4 | 16.6204 | 15.4189 | .6224 | .7807 |
| C5 | 16.1605 | 15.6088 | .6063 | .7843 |
| C6 | 16.1420 | 15.9798 | .4933 | .8111 |

Reliability Coefficients

N of Cases = 324.0 N of Items = 6
Alpha = .8184

Reliability

***** Method 1 (space saver) will be used for this analysis *****

RELIABILITY ANALYSIS - SCALE (ALPHA)

| Statistics for | Mean | Variance | Std Dev | N of |
|----------------|---------|----------|---------|----------------|
| SCALE | 19.7242 | 30.2915 | 5.5038 | Variables 6 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item- Total Correlation | Alpha if Item Deleted |
|----|-------------------------------------|---|--|-----------------------------|
| D1 | 16.2182 | 21.8246 | .7009 | .8824 |
| D2 | 16.0909 | 21.9674 | .7642 | .8741 |
| D3 | 16.4788 | 20.6272 | .7706 | .8715 |
| D4 | 16.5000 | 21.9103 | .7140 | .8805 |
| D5 | 16.7970 | 20.8979 | .6869 | .8860 |
| D6 | 16.5364 | 21.5807 | .7123 | .8807 |

Reliability Coefficients

| | | | |
|--------------|-------|--------------|---|
| N of Cases = | 330.0 | N of Items = | 6 |
| Alpha = | .8973 | | |

Reliability

***** Method 1 (space saver) will be used for this analysis *****

RELIABILITY ANALYSIS - SCALE (ALPHA)

| Statistics for | Mean | Variance | Std Dev | N of |
|----------------|---------|----------|---------|----------------|
| SCALE | 20.7515 | 22.3636 | 4.7290 | Variables 6 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item- Total Correlation | Alpha if Item Deleted |
|----|-------------------------------------|---|--|-----------------------------|
| E1 | 16.9939 | 16.2310 | .6598 | .8559 |
| E2 | 17.0091 | 16.3008 | .7045 | .8494 |
| E3 | 17.1091 | 15.7996 | .7195 | .8460 |
| E4 | 17.5394 | 15.7325 | .6506 | .8581 |
| E5 | 17.6030 | 15.5349 | .6905 | .8508 |
| E6 | 17.5030 | 15.9225 | .6486 | .8581 |

Reliability Coefficients

N of Cases = 330.0 N of Items = 6
Alpha = .8745

Reliability

***** Method 1 (space saver) will be used for this analysis *****

RELIABILITY ANALYSIS - SCALE (ALPHA)

| Statistics for | Mean | Variance | Std Dev | N of |
|----------------|---------|----------|---------|----------------|
| SCALE | 17.9009 | 13.5864 | 3.6860 | Variables 5 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item- Total Correlation | Alpha if Item Deleted |
|----|-------------------------------------|---|--|-----------------------------|
| F1 | 14.4644 | 8.5539 | .6449 | .7694 |
| F2 | 14.5232 | 9.0266 | .5649 | .7945 |
| F3 | 14.3251 | 9.7418 | .5186 | .8056 |
| F4 | 14.0402 | 9.0636 | .6494 | .7688 |
| F5 | 14.2508 | 9.0829 | .6686 | .7639 |

Reliability Coefficients

N of Cases = 323.0

N of Items = 5

Alpha = .8167

Reliability

REQUEST 12

***** Method 1 (space saver) will be used for this analysis *****

RELIABILITY ANALYSIS - SCALE (ALPHA)

| Statistics for | Mean | Variance | Std Dev | N of Variables |
|----------------|---------|----------|---------|----------------|
| SCALE | 23.0280 | 25.5773 | 5.0574 | 7 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Alpha if Item Deleted |
|----|----------------------------|--------------------------------|----------------------------------|-----------------------|
| G1 | 19.2648 | 19.7203 | .6026 | .7978 |
| G2 | 19.2150 | 19.9005 | .5945 | .7993 |
| G3 | 19.5826 | 20.0002 | .4969 | .8138 |
| G4 | 20.0779 | 18.6283 | .6134 | .7946 |
| G5 | 20.2181 | 18.4398 | .6227 | .7929 |
| G6 | 19.8692 | 19.3016 | .5793 | .8005 |
| G7 | 19.9408 | 19.3746 | .4961 | .8157 |

Reliability Coefficients

N of Cases = 321.0

N of Items = 7

Alpha = .8255

APPENDIX SPSS

3

EFA FREE LOADING

FACTOR

```

/VARIABLES b1 b2 b3 b5 b6 c1 c2 c3 c4 c5 c6 d1 d2 d3 d4 d5 d6 e1 e2 e3 e4
e5 e6 f1 f2 f3 f4 f5 g1 g2 g3 g4 g5 g6 g7 /MISSING LISTWISE /ANALYSIS b1 b2
b3 b5 b6 c1 c2 c3 c4 c5 c6 d1 d2 d3 d4 d5 d6 e1 e2 e3 e4 e5 e6 f1 f2 f3 f4
f5 g1 g2 g3 g4 g5 g6 g7
/PRINT INITIAL EXTRACTION
/PLOT EIGEN
/CRITERIA MINEIGEN(1) ITERATE(25)
/EXTRACTION PC
/ROTATION NOROTATE
/METHOD=CORRELATION .

```

Factor Analysis

Communalities

| | Initial | Extraction |
|--|---------|------------|
| B1: If I heard about a new information technology, I would look for ways to experiment with it | 1.000 | .680 |
| B2: Among my peers, I am usually the first to try out new information technology | 1.000 | .600 |
| B3: I like to experiment with new ICT | 1.000 | .622 |
| B5: I think ICT can promote fulfilment at work | 1.000 | .647 |
| B6: I think ICT can foster social development | 1.000 | .641 |
| C1: I believe that top management in our organization supports the ICT app | 1.000 | .709 |
| C2: Our organisation offers various types of ICT training programs | 1.000 | .680 |
| C3: The training programs conducted were job related | 1.000 | .574 |
| C4: Our organisation appraises ICT literacy of employees | 1.000 | .590 |
| C5: Our organization evaluates the ICT applications that we work with regularly | 1.000 | .601 |
| C6: Our ICT service desk does a great job in answering ICT related problems | 1.000 | .405 |
| D1: I am satisfied with the reliability of the system. | 1.000 | .695 |
| D2: I am satisfied with the system's ease of use. | 1.000 | .725 |
| D3: I am satisfied that the system is always accessible. | 1.000 | .758 |

Extraction Method: Principal Component Analysis.

Communalities

| | Initial | Extraction |
|---|---------|------------|
| D4: I am satisfied with the system's packaged software. | 1.000 | .665 |
| D5: I am satisfied with the system's processing speed. | 1.000 | .607 |
| D6: I am satisfied with the system's network environment | 1.000 | .690 |
| E1: I believe using ICT provided me with information that is useful | 1.000 | .785 |
| E2: I believe using ICT provided me with information that is accurate | 1.000 | .797 |
| E3: I believe using ICT provided me with information at the right time | 1.000 | .765 |
| E4: I believe our IT personnel understand our business functions | 1.000 | .583 |
| E5: I believe our IT personnel understand the organisation's policies and laws | 1.000 | .623 |
| E6: I believe our IT personnel are free to assist users when needed | 1.000 | .654 |
| F1: After deploying ICTs at work, our transparency had improved | 1.000 | .684 |
| F2: After deploying ICTs at work, we can increase public participation | 1.000 | .603 |
| F3: The Ministry of Finance's website has good information about all tax procedures | 1.000 | .466 |
| F4: After deploying ICTs at work, we can service customers much faster | 1.000 | .693 |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | 1.000 | .723 |
| G1: I believe ICT increased job productivity | 1.000 | .729 |
| G2: I believe ICT enabled me to do my job more quickly. | 1.000 | .738 |
| G3: I believe ICT improved my judgment at work | 1.000 | .589 |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | 1.000 | .694 |
| G5: The web information reduced my work as a tax advisor | 1.000 | .818 |

Extraction Method: Principal Component Analysis.

Communalities

| | Initial | Extractio |
|---|---------|-----------|
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | 1.000 | .731 |
| G7: I believe ICT has reduced my overall work load | 1.000 | .647 |

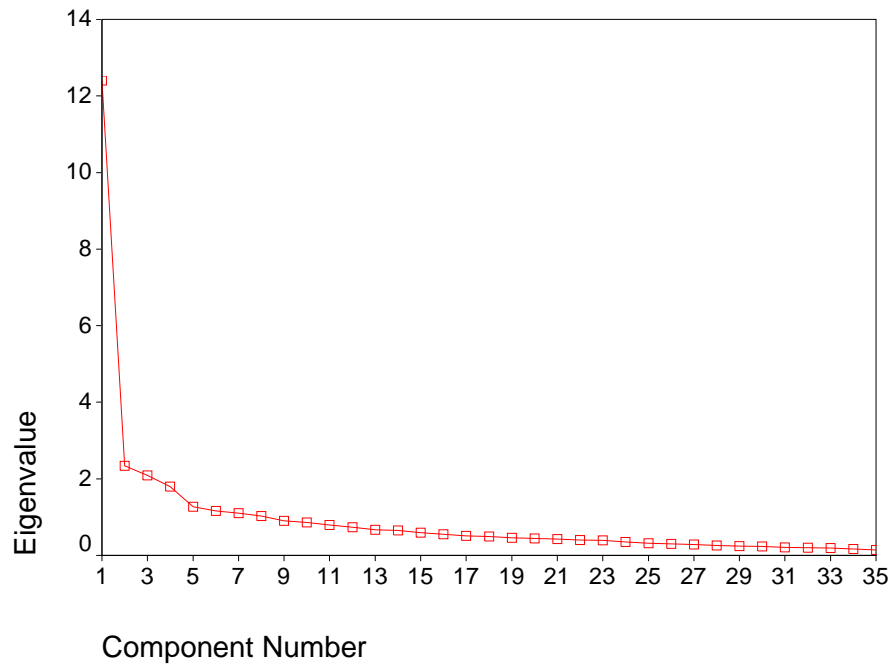
Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 12.407 | 35.450 | 35.450 | 12.407 | 35.450 | 35.450 |
| 2 | 2.344 | 6.698 | 42.148 | 2.344 | 6.698 | 42.148 |
| 3 | 2.089 | 5.970 | 48.118 | 2.089 | 5.970 | 48.118 |
| 4 | 1.798 | 5.138 | 53.256 | 1.798 | 5.138 | 53.256 |
| 5 | 1.273 | 3.637 | 56.893 | 1.273 | 3.637 | 56.893 |
| 6 | 1.164 | 3.326 | 60.219 | 1.164 | 3.326 | 60.219 |
| 7 | 1.107 | 3.163 | 63.382 | 1.107 | 3.163 | 63.382 |
| 8 | 1.027 | 2.935 | 66.317 | 1.027 | 2.935 | 66.317 |
| 9 | .901 | 2.575 | 68.893 | | | |
| 10 | .864 | 2.468 | 71.361 | | | |
| 11 | .792 | 2.263 | 73.624 | | | |
| 12 | .737 | 2.106 | 75.729 | | | |
| 13 | .670 | 1.915 | 77.644 | | | |
| 14 | .655 | 1.871 | 79.516 | | | |
| 15 | .593 | 1.694 | 81.210 | | | |
| 16 | .553 | 1.580 | 82.790 | | | |
| 17 | .510 | 1.458 | 84.248 | | | |
| 18 | .490 | 1.400 | 85.648 | | | |
| 19 | .458 | 1.308 | 86.957 | | | |
| 20 | .443 | 1.266 | 88.223 | | | |
| 21 | .427 | 1.220 | 89.443 | | | |
| 22 | .401 | 1.146 | 90.588 | | | |
| 23 | .390 | 1.113 | 91.702 | | | |
| 24 | .347 | .992 | 92.693 | | | |
| 25 | .319 | .911 | 93.604 | | | |
| 26 | .301 | .859 | 94.463 | | | |
| 27 | .283 | .808 | 95.271 | | | |
| 28 | .263 | .751 | 96.022 | | | |
| 29 | .246 | .704 | 96.726 | | | |
| 30 | .231 | .659 | 97.384 | | | |
| 31 | .211 | .604 | 97.988 | | | |
| 32 | .201 | .574 | 98.563 | | | |
| 33 | .192 | .549 | 99.112 | | | |
| 34 | .167 | .477 | 99.588 | | | |
| 35 | .144 | .412 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

Scree Plot



Component Matrix^a

| | Component | | | | | |
|--|-----------|------------|-----------|------------|------------|------------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| B1: If I heard about a new information technology, I would look for ways to experiment with it | .152 | .688 | .354 | 7.857E-02 | .128 | -.135 |
| B2: Among my peers, I am usually the first to try out new information technology | .177 | .565 | .321 | 1.038E-02 | .160 | -.266 |
| B3: I like to experiment with new ICT | 7.154E-02 | .693 | .310 | -8.409E-03 | .121 | -.126 |
| B5: I think ICT can promote fulfilment at work | .399 | .405 | .128 | -.108 | -4.201E-02 | .541 |
| B6: I think ICT can foster social development | .337 | .392 | .230 | .117 | -1.564E-02 | .443 |
| C1: I believe that top management in our organization supports the ICT app | .519 | -.101 | .193 | -6.448E-02 | -.343 | .212 |
| C2: Our organisation offers various types of ICT training programs | .605 | -3.128E-02 | .326 | -4.238E-02 | -.349 | 3.253E-04 |
| C3: The training programs conducted were job related | .652 | -1.491E-02 | .257 | 2.130E-02 | -.262 | 2.335E-02 |
| C4: Our organisation appraises ICT literacy of employees | .589 | -3.210E-02 | .288 | .319 | -.221 | -1.008E-02 |
| C5: Our organization evaluates the ICT applications that we work with regularly | .642 | -.167 | .253 | .275 | -6.846E-02 | .110 |
| C6: Our ICT service desk does a great job in answering ICT related problems | .572 | -.121 | 9.387E-02 | 7.110E-02 | -.130 | -.124 |
| D1: I am satisfied with the reliability of the system. | .686 | -.171 | .192 | -.154 | .285 | .232 |
| D2: I am satisfied with the system's ease of use. | .704 | -.271 | 6.585E-02 | -.203 | .204 | .227 |
| D3: I am satisfied that the system is always accessible. | .727 | -.269 | .155 | -.193 | .162 | 8.534E-02 |
| D4: I am satisfied with the system's packaged software. | .697 | -.282 | .143 | -.119 | .162 | 9.632E-02 |
| D5: I am satisfied with the system's processing speed. | .638 | -.248 | .123 | -.112 | .231 | -2.459E-02 |
| D6: I am satisfied with the system's network environment | .709 | -.217 | .126 | -5.245E-02 | .219 | -.119 |
| E1: I believe using ICT provided me with information that is useful | .675 | 8.395E-02 | .114 | -.206 | 5.495E-02 | -4.674E-02 |
| E2: I believe using ICT provided me with information that is accurate | .701 | .103 | .149 | -.166 | 2.119E-02 | -.144 |

Extraction Method: Principal Component Analysis.

Component Matrix^a

| | Component | | | | | |
|---|-----------|------------|------------|------------|------------|------------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| E3: I believe using ICT provided me with information at the right time | .726 | -2.811E-02 | 4.625E-02 | -.212 | -1.721E-02 | -9.560E-02 |
| E4: I believe our IT personnel understand our business functions | .682 | -.122 | 2.302E-02 | -2.767E-02 | .129 | -.263 |
| E5: I believe our IT personnel understand the organisation's policies and laws | .716 | -.104 | -1.722E-02 | 3.752E-02 | 5.095E-02 | -.288 |
| E6: I believe our IT personnel are free to assist users when needed | .712 | -5.566E-02 | .129 | 6.783E-02 | 1.931E-02 | -.317 |
| F1: After deploying ICTs at work, our transparency had improved | .684 | 4.171E-02 | -7.753E-02 | -6.362E-02 | -.373 | -4.306E-02 |
| F2: After deploying ICTs at work, we can increase public participation | .542 | 5.616E-02 | -.270 | .136 | -.291 | 7.450E-02 |
| F3: The Ministry of Finance's website has good information about all tax procedures | .570 | 1.618E-02 | -.139 | .237 | -.206 | -7.938E-02 |
| F4: After deploying ICTs at work, we can service customers much faster | .617 | .139 | -.438 | -.181 | -.124 | -4.207E-02 |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | .617 | .138 | -.419 | -.159 | -.197 | -7.630E-02 |
| G1: I believe ICT increased job productivity | .589 | .282 | -.440 | -.214 | 2.138E-02 | 6.010E-02 |
| G2: I believe ICT enabled me to do my job more quickly. | .619 | .255 | -.420 | -.271 | 8.201E-02 | 1.076E-02 |
| G3: I believe ICT improved my judgment at work | .594 | .293 | -.290 | -.205 | -2.225E-02 | -3.653E-02 |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | .534 | 5.441E-02 | -.287 | .540 | .114 | 1.198E-02 |
| G5: The web information reduced my work as a tax advisor | .587 | 2.641E-02 | -.137 | .644 | .118 | 9.799E-02 |
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | .567 | 7.315E-04 | -.187 | .559 | .177 | -1.302E-02 |
| G7: I believe ICT has reduced my overall work load | .442 | .105 | -.322 | 9.068E-02 | .386 | .199 |

Extraction Method: Principal Component Analysis.

Component Matrix^a

| | Component | |
|--|------------|------------|
| | 7 | 8 |
| B1: If I heard about a new information technology, I would look for ways to experiment with it | .134 | 1.025E-02 |
| B2: Among my peers, I am usually the first to try out new information technology | .204 | 8.768E-02 |
| B3: I like to experiment with new ICT | 8.084E-02 | -5.967E-02 |
| B5: I think ICT can promote fulfilment at work | 1.238E-02 | -3.401E-02 |
| B6: I think ICT can foster social development | -7.939E-02 | -.324 |
| C1: I believe that top management in our organization supports the ICT app | .131 | .457 |
| C2: Our organisation offers various types of ICT training programs | 8.362E-02 | .275 |
| C3: The training programs conducted were job related | -1.141E-02 | .112 |
| C4: Our organisation appraises ICT literacy of employees | 8.944E-02 | 1.486E-02 |
| C5: Our organization evaluates the ICT applications that we work with regularly | 1.677E-02 | 6.329E-02 |
| C6: Our ICT service desk does a great job in answering ICT related problems | .116 | -6.574E-02 |
| D1: I am satisfied with the reliability of the system. | 2.678E-03 | 7.553E-03 |
| D2: I am satisfied with the system's ease of use. | .103 | -7.894E-02 |
| D3: I am satisfied that the system is always accessible. | .217 | -.126 |
| D4: I am satisfied with the system's packaged software. | .145 | -8.837E-02 |
| D5: I am satisfied with the system's processing speed. | .218 | -9.670E-02 |
| D6: I am satisfied with the system's network environment | 1.082E-02 | -.244 |
| E1: I believe using ICT provided me with information that is useful | -.511 | 5.168E-03 |
| E2: I believe using ICT provided me with information that is accurate | -.474 | 4.150E-03 |

Extraction Method: Principal Component Analysis.

Component Matrix^a

| | Component | |
|---|------------|------------|
| | 7 | 8 |
| E3: I believe using ICT provided me with information at the right time | -.411 | .104 |
| E4: I believe our IT personnel understand our business functions | 1.222E-02 | .123 |
| E5: I believe our IT personnel understand the organisation's policies and laws | 3.829E-02 | .104 |
| E6: I believe our IT personnel are free to assist users when needed | 4.569E-02 | -.139 |
| F1: After deploying ICTs at work, our transparency had improved | -1.820E-02 | -.251 |
| F2: After deploying ICTs at work, we can increase public participation | -.194 | -.296 |
| F3: The Ministry of Finance's website has good information about all tax procedures | .102 | 7.634E-02 |
| F4: After deploying ICTs at work, we can service customers much faster | .206 | -9.103E-02 |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | .246 | -.133 |
| G1: I believe ICT increased job productivity | 1.451E-02 | .241 |
| G2: I believe ICT enabled me to do my job more quickly. | 3.676E-02 | .180 |
| G3: I believe ICT improved my judgment at work | 2.242E-03 | -.148 |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | .105 | -8.986E-02 |
| G5: The web information reduced my work as a tax advisor | -.110 | 6.277E-02 |
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | -.170 | 4.462E-02 |
| G7: I believe ICT has reduced my overall work load | -6.542E-05 | .374 |

Extraction Method: Principal Component Analysis.

a. 8 components extracted.

APPENDIX SPSS

4

EFA ON BCD – B4 ITEM

FACTOR

```
/VARIABLES b1 b2 b3 b5 b6 c1 c2 c3 c4 c5 c6 d1 d2 d3 d4 d5 d6 /MISSING  
LISTWISE /ANALYSIS b1 b2 b3 b5 b6 c1 c2 c3 c4 c5 c6 d1 d2 d3 d4 d5 d6  
/PRINT INITIAL KMO EXTRACTION  
/PLOT EIGEN  
/CRITERIA MINEIGEN(1) ITERATE(25)  
/EXTRACTION PC  
/ROTATION NOROTATE  
/METHOD=CORRELATION .
```

Factor Analysis

KMO and Bartlett's Test

| | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .887 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2246.308 |
| | df | 136 |
| | Sig. | .000 |

Communalities

| | Initial | Extraction |
|--|---------|------------|
| B1: If I heard about a new information technology, I would look for ways to experiment with it | 1.000 | .679 |
| B2: Among my peers, I am usually the first to try out new information technology | 1.000 | .584 |
| B3: I like to experiment with new ICT | 1.000 | .647 |
| B5: I think ICT can promote fulfilment at work | 1.000 | .713 |
| B6: I think ICT can foster social development | 1.000 | .622 |
| C1: I believe that top management in our organization supports the ICT app | 1.000 | .509 |
| C2: Our organisation offers various types of ICT training programs | 1.000 | .637 |
| C3: The training programs conducted were job related | 1.000 | .595 |
| C4: Our organisation appraises ICT literacy of employees | 1.000 | .632 |
| C5: Our organization evaluates the ICT applications that we work with regularly | 1.000 | .542 |
| C6: Our ICT service desk does a great job in answering ICT related problems | 1.000 | .437 |
| D1: I am satisfied with the reliability of the system. | 1.000 | .653 |
| D2: I am satisfied with the system's ease of use. | 1.000 | .718 |
| D3: I am satisfied that the system is always accessible. | 1.000 | .718 |
| D4: I am satisfied with the system's packaged software. | 1.000 | .666 |
| D5: I am satisfied with the system's processing speed. | 1.000 | .648 |
| D6: I am satisfied with the system's network environment | 1.000 | .660 |

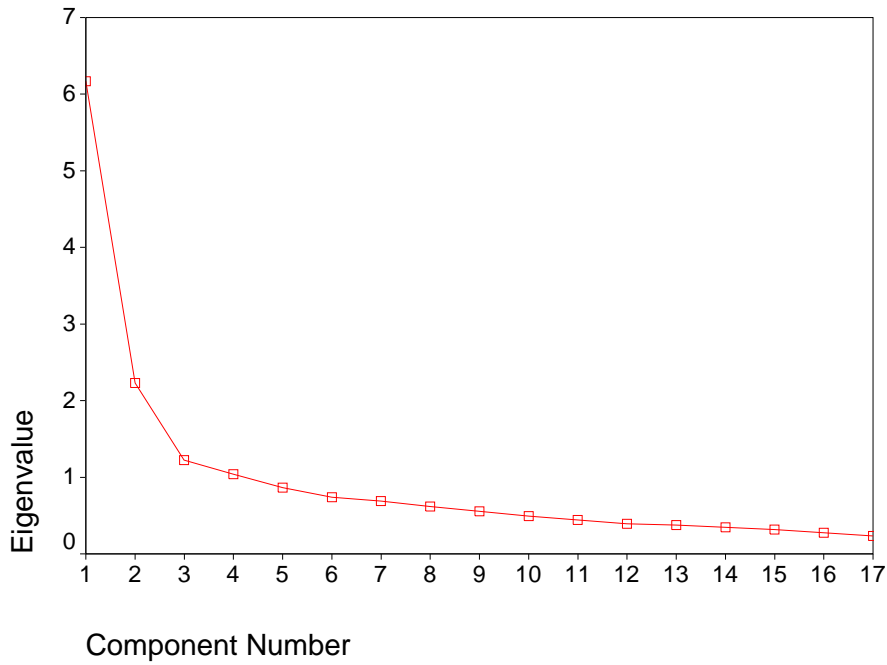
Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 6.170 | 36.293 | 36.293 | 6.170 | 36.293 | 36.293 |
| 2 | 2.229 | 13.111 | 49.404 | 2.229 | 13.111 | 49.404 |
| 3 | 1.223 | 7.195 | 56.599 | 1.223 | 7.195 | 56.599 |
| 4 | 1.039 | 6.115 | 62.713 | 1.039 | 6.115 | 62.713 |
| 5 | .863 | 5.075 | 67.788 | | | |
| 6 | .740 | 4.356 | 72.144 | | | |
| 7 | .688 | 4.047 | 76.190 | | | |
| 8 | .617 | 3.628 | 79.819 | | | |
| 9 | .557 | 3.279 | 83.098 | | | |
| 10 | .492 | 2.896 | 85.994 | | | |
| 11 | .443 | 2.608 | 88.602 | | | |
| 12 | .391 | 2.301 | 90.903 | | | |
| 13 | .376 | 2.214 | 93.116 | | | |
| 14 | .345 | 2.032 | 95.148 | | | |
| 15 | .316 | 1.858 | 97.005 | | | |
| 16 | .275 | 1.620 | 98.626 | | | |
| 17 | .234 | 1.374 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

Scree Plot



Component Matrix^a

| | Component | | | |
|--|-----------|------------|-----------|------------|
| | 1 | 2 | 3 | 4 |
| B1: If I heard about a new information technology, I would look for ways to experiment with it | .159 | .775 | 8.053E-02 | .217 |
| B2: Among my peers, I am usually the first to try out new information technology | .179 | .643 | 6.220E-02 | .367 |
| B3: I like to experiment with new ICT | 6.627E-02 | .747 | .223 | .186 |
| B5: I think ICT can promote fulfilment at work | .396 | .431 | .200 | -.575 |
| B6: I think ICT can foster social development | .355 | .469 | 9.427E-02 | -.517 |
| C1: I believe that top management in our organization supports the ICT app | .578 | -7.211E-03 | -.349 | -.232 |
| C2: Our organisation offers various types of ICT training programs | .659 | .113 | -.435 | 2.527E-02 |
| C3: The training programs conducted were job related | .672 | .107 | -.350 | -9.163E-02 |
| C4: Our organisation appraises ICT literacy of employees | .638 | .131 | -.438 | .128 |
| C5: Our organization evaluates the ICT applications that we work with regularly | .700 | -9.566E-03 | -.223 | 4.458E-02 |
| C6: Our ICT service desk does a great job in answering ICT related problems | .584 | -6.207E-02 | -.218 | .210 |
| D1: I am satisfied with the reliability of the system. | .753 | -.122 | .263 | -3.593E-02 |
| D2: I am satisfied with the system's ease of use. | .753 | -.256 | .290 | -3.293E-02 |
| D3: I am satisfied that the system is always accessible. | .800 | -.190 | .201 | 4.119E-02 |
| D4: I am satisfied with the system's packaged software. | .756 | -.199 | .228 | -6.052E-02 |
| D5: I am satisfied with the system's processing speed. | .696 | -.182 | .278 | .231 |
| D6: I am satisfied with the system's network environment | .732 | -.127 | .262 | .199 |

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

APPENDIX SPSS

5

CFA ON BCD

FACTOR

```
/VARIABLES b1 b2 b3 b5 b6 c1 c2 c3 c4 c6 d1 d2 d3 d4 d5 d6 /MISSING  
LISTWISE /ANALYSIS b1 b2 b3 b5 b6 c1 c2 c3 c4 c6 d1 d2 d3 d4 d5 d6  
/PRINT INITIAL KMO EXTRACTION ROTATION  
/CRITERIA FACTORS(3) ITERATE(25)  
/FORMAT BLANK(.4)  
/CRITERIA ITERATE(25)  
/EXTRACTION PC  
/ROTATION VARIMAX  
/METHOD=CORRELATION .
```

Factor Analysis

KMO and Bartlett's Test

| | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .886 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2050.878 |
| | df | 120 |
| | Sig. | .000 |

Communalities

| | Initial | Extraction |
|--|---------|------------|
| B1: If I heard about a new information technology, I would look for ways to experiment with it | 1.000 | .631 |
| B2: Among my peers, I am usually the first to try out new information technology | 1.000 | .446 |
| B3: I like to experiment with new ICT | 1.000 | .618 |
| B5: I think ICT can promote fulfilment at work | 1.000 | .400 |
| B6: I think ICT can foster social development | 1.000 | .375 |
| C1: I believe that top management in our organization supports the ICT app | 1.000 | .484 |
| C2: Our organisation offers various types of ICT training programs | 1.000 | .706 |
| C3: The training programs conducted were job related | 1.000 | .644 |
| C4: Our organisation appraises ICT literacy of employees | 1.000 | .535 |
| C6: Our ICT service desk does a great job in answering ICT related problems | 1.000 | .394 |
| D1: I am satisfied with the reliability of the system. | 1.000 | .653 |
| D2: I am satisfied with the system's ease of use. | 1.000 | .719 |
| D3: I am satisfied that the system is always accessible. | 1.000 | .722 |
| D4: I am satisfied with the system's packaged software. | 1.000 | .661 |
| D5: I am satisfied with the system's processing speed. | 1.000 | .595 |
| D6: I am satisfied with the system's network environment | 1.000 | .624 |

Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Initial Eigenvalues | | |
|-----------|---------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % |
| 1 | 5.768 | 36.049 | 36.049 |
| 2 | 2.246 | 14.039 | 50.087 |
| 3 | 1.193 | 7.458 | 57.546 |
| 4 | 1.023 | 6.391 | 63.937 |
| 5 | .789 | 4.933 | 68.870 |
| 6 | .731 | 4.568 | 73.439 |
| 7 | .620 | 3.878 | 77.317 |
| 8 | .552 | 3.453 | 80.770 |
| 9 | .541 | 3.384 | 84.153 |
| 10 | .487 | 3.042 | 87.195 |
| 11 | .429 | 2.682 | 89.878 |
| 12 | .387 | 2.416 | 92.293 |
| 13 | .362 | 2.263 | 94.557 |
| 14 | .333 | 2.083 | 96.639 |
| 15 | .305 | 1.905 | 98.544 |
| 16 | .233 | 1.456 | 100.000 |

Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|-----------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 5.768 | 36.049 | 36.049 | 4.047 | 25.293 | 25.293 |
| 2 | 2.246 | 14.039 | 50.087 | 2.782 | 17.389 | 42.681 |
| 3 | 1.193 | 7.458 | 57.546 | 2.378 | 14.865 | 57.546 |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
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| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |

Extraction Method: Principal Component Analysis.

Component Matrix^a

| | Component | | |
|--|-----------|------|-------|
| | 1 | 2 | 3 |
| B1: If I heard about a new information technology, I would look for ways to experiment with it | | .771 | |
| B2: Among my peers, I am usually the first to try out new information technology | | .637 | |
| B3: I like to experiment with new ICT | | .750 | |
| B5: I think ICT can promote fulfilment at work | .421 | .440 | |
| B6: I think ICT can foster social development | | .476 | |
| C1: I believe that top management in our organization supports the ICT app | .569 | | |
| C2: Our organisation offers various types of ICT training programs | .668 | | -.500 |
| C3: The training programs conducted were job related | .683 | | -.411 |
| C4: Our organisation appraises ICT literacy of employees | .611 | | |
| C6: Our ICT service desk does a great job in answering ICT related problems | .587 | | |
| D1: I am satisfied with the reliability of the system. | .756 | | |
| D2: I am satisfied with the system's ease of use. | .763 | | |
| D3: I am satisfied that the system is always accessible. | .808 | | |
| D4: I am satisfied with the system's packaged software. | .758 | | |
| D5: I am satisfied with the system's processing speed. | .703 | | |
| D6: I am satisfied with the system's network environment | .740 | | |

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Rotated Component Matrix^a

| | Component | | |
|--|-----------|------|------|
| | 1 | 2 | 3 |
| B1: If I heard about a new information technology, I would look for ways to experiment with it | | | .785 |
| B2: Among my peers, I am usually the first to try out new information technology | | | .660 |
| B3: I like to experiment with new ICT | | | .781 |
| B5: I think ICT can promote fulfilment at work | | | .553 |
| B6: I think ICT can foster social development | | | .559 |
| C1: I believe that top management in our organization supports the ICT app | | .655 | |
| C2: Our organisation offers various types of ICT training programs | | .802 | |
| C3: The training programs conducted were job related | | .738 | |
| C4: Our organisation appraises ICT literacy of employees | | .675 | |
| C6: Our ICT service desk does a great job in answering ICT related problems | | .515 | |
| D1: I am satisfied with the reliability of the system. | .766 | | |
| D2: I am satisfied with the system's ease of use. | .818 | | |
| D3: I am satisfied that the system is always accessible. | .784 | | |
| D4: I am satisfied with the system's packaged software. | .768 | | |
| D5: I am satisfied with the system's processing speed. | .744 | | |
| D6: I am satisfied with the system's network environment | .748 | | |

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 5 iterations.

Component Transformation Matrix

| Component | 1 | 2 | 3 |
|-----------|-------|-------|------|
| 1 | .774 | .589 | .232 |
| 2 | -.325 | .055 | .944 |
| 3 | .543 | -.806 | .234 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

APPENDIX SPSS

6

EFA ON EFG

FACTOR

```
/VARIABLES e1 e2 e3 e4 e5 e6 f1 f2 f3 f4 f5 g1 g2 g3 g4 g5 g6 g7 /MISSING  
LISTWISE /ANALYSIS e1 e2 e3 e4 e5 e6 f1 f2 f3 f4 f5 g1 g2 g3 g4 g5 g6 g7  
/FORMAT BLANK(.4)  
/PRINT INITIAL KMO EXTRACTION  
/PLOT EIGEN  
/CRITERIA MINEIGEN(1) ITERATE(25)  
/EXTRACTION PC  
/ROTATION NOROTATE  
/METHOD=CORRELATION .
```

- - - - - F A C T O R A N A L Y S I S - - - - -

Factor Analysis

KMO and Bartlett's Test

| | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .906 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 3191.581 |
| | df | 153 |
| | Sig. | .000 |

Communalities

| | Initial | Extraction |
|---|---------|------------|
| E1: I believe using ICT provided me with information that is useful | 1.000 | .690 |
| E2: I believe using ICT provided me with information that is accurate | 1.000 | .741 |
| E3: I believe using ICT provided me with information at the right time | 1.000 | .731 |
| E4: I believe our IT personnel understand our business functions | 1.000 | .558 |
| E5: I believe our IT personnel understand the organisation's policies and laws | 1.000 | .591 |
| E6: I believe our IT personnel are free to assist users when needed | 1.000 | .587 |
| F1: After deploying ICTs at work, our transparency had improved | 1.000 | .701 |
| F2: After deploying ICTs at work, we can increase public participation | 1.000 | .519 |
| F3: The Ministry of Finance's website has good information about all tax procedures | 1.000 | .508 |
| F4: After deploying ICTs at work, we can service customers much faster | 1.000 | .672 |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | 1.000 | .716 |
| G1: I believe ICT increased job productivity | 1.000 | .753 |
| G2: I believe ICT enabled me to do my job more quickly. | 1.000 | .766 |
| G3: I believe ICT improved my judgment at work | 1.000 | .578 |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | 1.000 | .673 |
| G5: The web information reduced my work as a tax advisor | 1.000 | .811 |
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | 1.000 | .729 |
| G7: I believe ICT has reduced my overall work load | 1.000 | .640 |

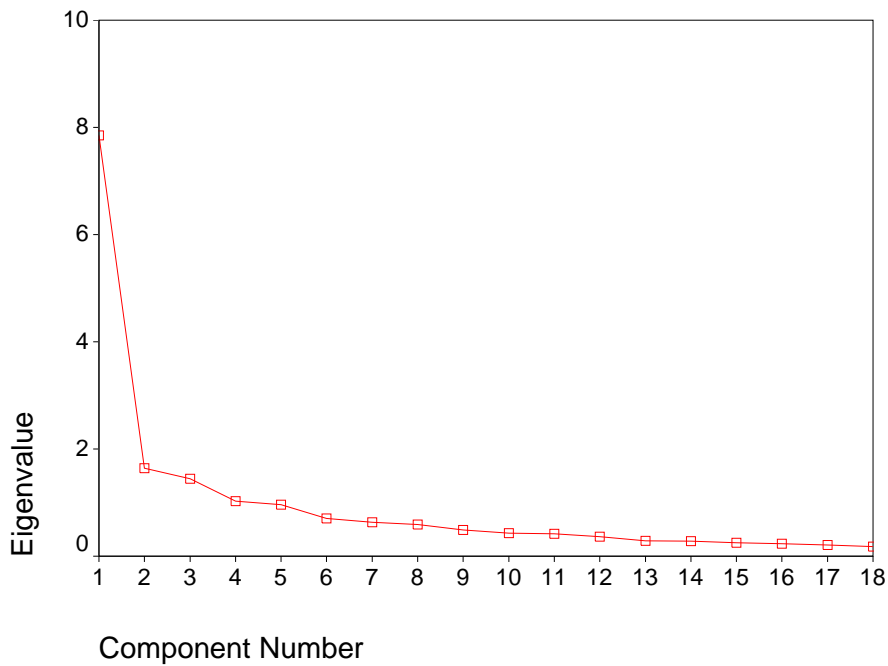
Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 7.853 | 43.627 | 43.627 | 7.853 | 43.627 | 43.627 |
| 2 | 1.642 | 9.122 | 52.749 | 1.642 | 9.122 | 52.749 |
| 3 | 1.443 | 8.018 | 60.767 | 1.443 | 8.018 | 60.767 |
| 4 | 1.027 | 5.707 | 66.474 | 1.027 | 5.707 | 66.474 |
| 5 | .959 | 5.325 | 71.799 | | | |
| 6 | .704 | 3.913 | 75.712 | | | |
| 7 | .633 | 3.517 | 79.229 | | | |
| 8 | .593 | 3.297 | 82.526 | | | |
| 9 | .490 | 2.722 | 85.248 | | | |
| 10 | .432 | 2.397 | 87.645 | | | |
| 11 | .417 | 2.316 | 89.961 | | | |
| 12 | .367 | 2.036 | 91.998 | | | |
| 13 | .289 | 1.606 | 93.603 | | | |
| 14 | .280 | 1.556 | 95.160 | | | |
| 15 | .250 | 1.390 | 96.549 | | | |
| 16 | .231 | 1.281 | 97.830 | | | |
| 17 | .210 | 1.167 | 98.997 | | | |
| 18 | .180 | 1.003 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

Scree Plot



Component Matrix^a

| | Component | | | |
|---|-----------|------|-------|-------|
| | 1 | 2 | 3 | 4 |
| E1: I believe using ICT provided me with information that is useful | .669 | | | |
| E2: I believe using ICT provided me with information that is accurate | .697 | | -.407 | |
| E3: I believe using ICT provided me with information at the right time | .729 | | | |
| E4: I believe our IT personnel understand our business functions | .674 | | | |
| E5: I believe our IT personnel understand the organisation's policies and laws | .719 | | | |
| E6: I believe our IT personnel are free to assist users when needed | .681 | | | |
| F1: After deploying ICTs at work, our transparency had improved | .702 | | | -.430 |
| F2: After deploying ICTs at work, we can increase public participation | .611 | | | |
| F3: The Ministry of Finance's website has good information about all tax procedures | .591 | | | |
| F4: After deploying ICTs at work, we can service customers much faster | .690 | | | |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | .692 | | | |
| G1: I believe ICT increased job productivity | .690 | | | |
| G2: I believe ICT enabled me to do my job more quickly. | .706 | | | |
| G3: I believe ICT improved my judgment at work | .670 | | | |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | .597 | .529 | | |
| G5: The web information reduced my work as a tax advisor | .623 | .643 | | |
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | .607 | .593 | | |
| G7: I believe ICT has reduced my overall work load | .497 | | | .537 |

Extraction Method: Principal Component Analysis.

Component Matrix^a

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

APPENDIX SPSS

7

CGA ON EFG

FACTOR

```
/VARIABLES e1 e2 e3 e4 e5 e6 f2 f3 f4 f5 g1 g2 g3 g4 g5 g6 /MISSING  
PAIRWISE /ANALYSIS e1 e2 e3 e4 e5 e6 f2 f3 f4 f5 g1 g2 g3 g4 g5 g6  
/PRINT INITIAL KMO EXTRACTION ROTATION  
/FORMAT BLANK(.4)  
/CRITERIA FACTORS(3) ITERATE(25)  
/EXTRACTION PC  
/CRITERIA ITERATE(25)  
/ROTATION VARIMAX  
/METHOD=CORRELATION .
```

Factor Analysis

KMO and Bartlett's Test

| | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .895 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2928.864 |
| | df | 120 |
| | Sig. | .000 |

Communalities

| | Initial | Extraction |
|---|---------|------------|
| E1: I believe using ICT provided me with information that is useful | 1.000 | .693 |
| E2: I believe using ICT provided me with information that is accurate | 1.000 | .728 |
| E3: I believe using ICT provided me with information at the right time | 1.000 | .717 |
| E4: I believe our IT personnel understand our business functions | 1.000 | .529 |
| E5: I believe our IT personnel understand the organisation's policies and laws | 1.000 | .578 |
| E6: I believe our IT personnel are free to assist users when needed | 1.000 | .550 |
| F2: After deploying ICTs at work, we can increase public participation | 1.000 | .401 |
| F3: The Ministry of Finance's website has good information about all tax procedures | 1.000 | .434 |
| F4: After deploying ICTs at work, we can service customers much faster | 1.000 | .663 |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | 1.000 | .689 |
| G1: I believe ICT increased job productivity | 1.000 | .674 |
| G2: I believe ICT enabled me to do my job more quickly. | 1.000 | .700 |
| G3: I believe ICT improved my judgment at work | 1.000 | .563 |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | 1.000 | .685 |
| G5: The web information reduced my work as a tax advisor | 1.000 | .797 |
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | 1.000 | .710 |

Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Initial Eigenvalues | | |
|-----------|---------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % |
| 1 | 7.109 | 44.434 | 44.434 |
| 2 | 1.614 | 10.090 | 54.524 |
| 3 | 1.388 | 8.673 | 63.196 |
| 4 | .988 | 6.173 | 69.369 |
| 5 | .790 | 4.940 | 74.309 |
| 6 | .649 | 4.055 | 78.364 |
| 7 | .597 | 3.731 | 82.095 |
| 8 | .511 | 3.191 | 85.286 |
| 9 | .448 | 2.803 | 88.089 |
| 10 | .429 | 2.682 | 90.771 |
| 11 | .296 | 1.849 | 92.620 |
| 12 | .274 | 1.714 | 94.334 |
| 13 | .251 | 1.568 | 95.902 |
| 14 | .237 | 1.483 | 97.385 |
| 15 | .224 | 1.398 | 98.783 |
| 16 | .195 | 1.217 | 100.000 |

Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|-----------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 7.109 | 44.434 | 44.434 | 3.578 | 22.365 | 22.365 |
| 2 | 1.614 | 10.090 | 54.524 | 3.548 | 22.173 | 44.538 |
| 3 | 1.388 | 8.673 | 63.196 | 2.985 | 18.659 | 63.196 |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |

Extraction Method: Principal Component Analysis.

Component Matrix^a

| | Component | | |
|---|-----------|------|-------|
| | 1 | 2 | 3 |
| E1: I believe using ICT provided me with information that is useful | .675 | | -.450 |
| E2: I believe using ICT provided me with information that is accurate | .697 | | -.457 |
| E3: I believe using ICT provided me with information at the right time | .735 | | |
| E4: I believe our IT personnel understand our business functions | .668 | | |
| E5: I believe our IT personnel understand the organisation's policies and laws | .721 | | |
| E6: I believe our IT personnel are free to assist users when needed | .684 | | |
| F2: After deploying ICTs at work, we can increase public participation | .608 | | |
| F3: The Ministry of Finance's website has good information about all tax procedures | .591 | | |
| F4: After deploying ICTs at work, we can service customers much faster | .686 | | |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | .700 | | |
| G1: I believe ICT increased job productivity | .696 | | |
| G2: I believe ICT enabled me to do my job more quickly. | .701 | | |
| G3: I believe ICT improved my judgment at work | .656 | | |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | .600 | .495 | |
| G5: The web information reduced my work as a tax advisor | .613 | .644 | |
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | .609 | .582 | |

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Rotated Component Matrix^a

| | Component | | |
|---|-----------|------|------|
| | 1 | 2 | 3 |
| E1: I believe using ICT provided me with information that is useful | .795 | | |
| E2: I believe using ICT provided me with information that is accurate | .814 | | |
| E3: I believe using ICT provided me with information at the right time | .779 | | |
| E4: I believe our IT personnel understand our business functions | .625 | | |
| E5: I believe our IT personnel understand the organisation's policies and laws | .613 | | |
| E6: I believe our IT personnel are free to assist users when needed | .619 | | |
| F2: After deploying ICTs at work, we can increase public participation | | .433 | |
| F3: The Ministry of Finance's website has good information about all tax procedures | | | .547 |
| F4: After deploying ICTs at work, we can service customers much faster | | .762 | |
| F5: After deploying ICTs at work, we can deliver tailored services to citizens | | .774 | |
| G1: I believe ICT increased job productivity | | .766 | |
| G2: I believe ICT enabled me to do my job more quickly. | | .777 | |
| G3: I believe ICT improved my judgment at work | | .678 | |
| G4: I believe ICT reduced our interaction with citizens due to the web offered services | | | .775 |
| G5: The web information reduced my work as a tax advisor | | | .864 |
| G6: Putting all the tax material on the web was a good taxpayer teaching tool | | | .800 |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Component Transformation Matrix

| Component | 1 | 2 | 3 |
|-----------|-------|-------|------|
| 1 | .618 | .606 | .501 |
| 2 | -.181 | -.511 | .840 |
| 3 | -.765 | .610 | .206 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

APPENDIX SPSS

8

CFA ON RE-ARRANGED QUESTIONNAIRE

FACTOR

```
/VARIABLES e1 e2 e3 e4 e5 e6 p1 p2 p3 p4 p5 p6 w1 w2 w3 w4 /MISSING  
PAIRWISE /ANALYSIS e1 e2 e3 e4 e5 e6 p1 p2 p3 p4 p5 p6 w1 w2 w3 w4  
/PRINT INITIAL KMO EXTRACTION ROTATION FSCORE  
/FORMAT BLANK(.4)  
/CRITERIA FACTORS(3) ITERATE(25)  
/EXTRACTION PC  
/CRITERIA ITERATE(25)  
/ROTATION VARIMAX  
/SAVE REG(ALL)  
/METHOD=CORRELATION .
```

Factor Analysis

KMO and Bartlett's Test

| | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .895 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2928.864 |
| | df | 120 |
| | Sig. | .000 |

Communalities

| | Initial | Extraction |
|---|---------|------------|
| E1: I believe using ICT provided me with information that is useful | 1.000 | .693 |
| E2: I believe using ICT provided me with information that is accurate | 1.000 | .728 |
| E3: I believe using ICT provided me with information at the right time | 1.000 | .717 |
| E4: I believe our IT personnel understand our business functions | 1.000 | .529 |
| E5: I believe our IT personnel understand the organisation's policies and laws | 1.000 | .578 |
| E6: I believe our IT personnel are free to assist users when needed | 1.000 | .550 |
| P1: After deploying ICTs at work, we can increase public participation | 1.000 | .401 |
| P2: After deploying ICTs at work, we can service customers much faster | 1.000 | .663 |
| P3: I believe ICT increased job productivity | 1.000 | .674 |
| P4: I believe ICT improved my judgment at work | 1.000 | .563 |
| P5: I believe ICT enabled me to do my job more quickly. | 1.000 | .700 |
| P6: After deploying ICTs at work, we can deliver tailored services to citizens | 1.000 | .689 |
| W1: The Ministry of Finance's website has good information about all tax procedures | 1.000 | .434 |
| W2: I believe ICT reduced our interaction with citizens due to the web offered services | 1.000 | .685 |
| W3: The web information reduced my work as a tax advisor | 1.000 | .797 |
| W4: Putting all the tax material on the web was a good taxpayer teaching tool | 1.000 | .710 |

Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Initial Eigenvalues | | |
|-----------|---------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % |
| 1 | 7.109 | 44.434 | 44.434 |
| 2 | 1.614 | 10.090 | 54.524 |
| 3 | 1.388 | 8.673 | 63.196 |
| 4 | .988 | 6.173 | 69.369 |
| 5 | .790 | 4.940 | 74.309 |
| 6 | .649 | 4.055 | 78.364 |
| 7 | .597 | 3.731 | 82.095 |
| 8 | .511 | 3.191 | 85.286 |
| 9 | .448 | 2.803 | 88.089 |
| 10 | .429 | 2.682 | 90.771 |
| 11 | .296 | 1.849 | 92.620 |
| 12 | .274 | 1.714 | 94.334 |
| 13 | .251 | 1.568 | 95.902 |
| 14 | .237 | 1.483 | 97.385 |
| 15 | .224 | 1.398 | 98.783 |
| 16 | .195 | 1.217 | 100.000 |

Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|-----------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 7.109 | 44.434 | 44.434 | 3.578 | 22.365 | 22.365 |
| 2 | 1.614 | 10.090 | 54.524 | 3.548 | 22.173 | 44.538 |
| 3 | 1.388 | 8.673 | 63.196 | 2.985 | 18.659 | 63.196 |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |

Extraction Method: Principal Component Analysis.

Component Matrix^a

| | Component | | |
|---|-----------|------|-------|
| | 1 | 2 | 3 |
| E1: I believe using ICT provided me with information that is useful | .675 | | -.450 |
| E2: I believe using ICT provided me with information that is accurate | .697 | | -.457 |
| E3: I believe using ICT provided me with information at the right time | .735 | | |
| E4: I believe our IT personnel understand our business functions | .668 | | |
| E5: I believe our IT personnel understand the organisation's policies and laws | .721 | | |
| E6: I believe our IT personnel are free to assist users when needed | .684 | | |
| P1: After deploying ICTs at work, we can increase public participation | .608 | | |
| P2: After deploying ICTs at work, we can service customers much faster | .686 | | |
| P3: I believe ICT increased job productivity | .696 | | |
| P4: I believe ICT improved my judgment at work | .656 | | |
| P5: I believe ICT enabled me to do my job more quickly. | .701 | | |
| P6: After deploying ICTs at work, we can deliver tailored services to citizens | .700 | | |
| W1: The Ministry of Finance's website has good information about all tax procedures | .591 | | |
| W2: I believe ICT reduced our interaction with citizens due to the web offered services | .600 | .495 | |
| W3: The web information reduced my work as a tax advisor | .613 | .644 | |
| W4: Putting all the tax material on the web was a good taxpayer teaching tool | .609 | .582 | |

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Rotated Component Matrix^a

| | Component | | |
|---|-----------|------|------|
| | 1 | 2 | 3 |
| E1: I believe using ICT provided me with information that is useful | .795 | | |
| E2: I believe using ICT provided me with information that is accurate | .814 | | |
| E3: I believe using ICT provided me with information at the right time | .779 | | |
| E4: I believe our IT personnel understand our business functions | .625 | | |
| E5: I believe our IT personnel understand the organisation's policies and laws | .613 | | |
| E6: I believe our IT personnel are free to assist users when needed | .619 | | |
| P1: After deploying ICTs at work, we can increase public participation | | .433 | |
| P2: After deploying ICTs at work, we can service customers much faster | | .762 | |
| P3: I believe ICT increased job productivity | | .766 | |
| P4: I believe ICT improved my judgment at work | | .678 | |
| P5: I believe ICT enabled me to do my job more quickly. | | .777 | |
| P6: After deploying ICTs at work, we can deliver tailored services to citizens | | .774 | |
| W1: The Ministry of Finance's website has good information about all tax procedures | | | .547 |
| W2: I believe ICT reduced our interaction with citizens due to the web offered services | | | .775 |
| W3: The web information reduced my work as a tax advisor | | | .864 |
| W4: Putting all the tax material on the web was a good taxpayer teaching tool | | | .800 |

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Component Transformation Matrix

| Component | 1 | 2 | 3 |
|-----------|-------|-------|------|
| 1 | .618 | .606 | .501 |
| 2 | -.181 | -.511 | .840 |
| 3 | -.765 | .610 | .206 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Component Score Coefficient Matrix

| | Component | | |
|---|-----------|-------|-------|
| | 1 | 2 | 3 |
| E1: I believe using ICT provided me with information that is useful | .328 | -.081 | -.116 |
| E2: I believe using ICT provided me with information that is accurate | .333 | -.083 | -.114 |
| E3: I believe using ICT provided me with information at the right time | .295 | -.052 | -.094 |
| E4: I believe our IT personnel understand our business functions | .212 | -.079 | .021 |
| E5: I believe our IT personnel understand the organisation's policies and laws | .184 | -.059 | .046 |
| E6: I believe our IT personnel are free to assist users when needed | .202 | -.089 | .050 |
| P1: After deploying ICTs at work, we can increase public participation | -.044 | .102 | .102 |
| P2: After deploying ICTs at work, we can service customers much faster | -.119 | .296 | -.018 |
| P3: I believe ICT increased job productivity | -.071 | .292 | -.070 |
| P4: I believe ICT improved my judgment at work | -.028 | .243 | -.076 |
| P5: I believe ICT enabled me to do my job more quickly. | -.047 | .295 | -.102 |
| P6: After deploying ICTs at work, we can deliver tailored services to citizens | -.125 | .300 | -.011 |
| W1: The Ministry of Finance's website has good information about all tax procedures | -.032 | .005 | .199 |
| W2: I believe ICT reduced our interaction with citizens due to the web offered services | -.160 | .019 | .342 |
| W3: The web information reduced my work as a tax advisor | -.060 | -.119 | .390 |
| W4: Putting all the tax material on the web was a good taxpayer teaching tool | -.029 | -.119 | .350 |

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 Component Scores.

Component Score Covariance Matrix

| Component | 1 | 2 | 3 |
|-----------|-----------|-----------|-----------|
| 1 | 1.000 | 2.406E-16 | 2.471E-16 |
| 2 | 2.406E-16 | 1.000 | .000 |
| 3 | 2.471E-16 | .000 | 1.000 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

APPENDIX SPSS

9

FREQUENCIES AFTER CFA SOLUTION

FREQUENCIES

```
VARIABLES=b1 b2 b3 b4 b5 b6 c1 c2 c3 c4 c5 c6 d1 d2 d3 d4 d5 d6 e1 e2 e3 e4
e5 e6 p1 p2 p3 p4 p5 p6 w1 w2 w3 w4
/BARCHART PERCENT
/STATISTICS=STDDEV VARIANCE MEAN MEDIAN
/ORDER= ANALYSIS .
```

Frequencies

Statistics

| | | B1: If I heard about a new information technology, I would look for ways to experiment with it | B2: Among my peers, I am usually the first to try out new information technology | B3: I like to experiment with new ICT | B4: I think ICT can decrease bureaucracy | B5: I think ICT can promote fulfilment at work |
|----------------|---------|--|--|---------------------------------------|--|--|
| N | Valid | 326 | 325 | 331 | 329 | 332 |
| | Missing | 6 | 7 | 1 | 3 | 0 |
| Mean | | 3.72 | 3.15 | 4.21 | 3.57 | 4.03 |
| Median | | 4.00 | 3.00 | 4.00 | 4.00 | 4.00 |
| Std. Deviation | | .99 | 1.12 | .79 | 1.11 | .85 |
| Variance | | .98 | 1.25 | .63 | 1.24 | .72 |

Statistics

| | | B6: I think ICT can foster social development | C1: I believe that top management in our organization supports the ICT app | C2: Our organisation offers various types of ICT training programs | C3: The training programs conducted were job related | C4: Our organisation appraises ICT literacy of employees |
|----------------|---------|---|--|--|--|--|
| N | Valid | 332 | 331 | 330 | 330 | 331 |
| | Missing | 0 | 1 | 2 | 2 | 1 |
| Mean | | 3.92 | 3.88 | 3.49 | 3.52 | 2.39 |
| Median | | 4.00 | 4.00 | 4.00 | 4.00 | 2.00 |
| Std. Deviation | | 1.02 | .89 | 1.12 | 1.07 | 1.10 |
| Variance | | 1.05 | .80 | 1.25 | 1.15 | 1.22 |

Statistics

| | | C5: Our organization evaluates the ICT applications that we work with regularly | C6: Our ICT service desk does a great job in answering ICT related problems | D1: I am satisfied with the reliability of the system. | D2: I am satisfied with the system's ease of use. | D3: I am satisfied that the system is always accessible. |
|----------------|---------|---|---|--|---|--|
| N | Valid | 330 | 331 | 332 | 332 | 331 |
| | Missing | 2 | 1 | 0 | 0 | 1 |
| Mean | | 2.86 | 2.87 | 3.51 | 3.63 | 3.25 |
| Median | | 3.00 | 3.00 | 4.00 | 4.00 | 4.00 |
| Std. Deviation | | 1.10 | 1.19 | 1.11 | 1.02 | 1.18 |
| Variance | | 1.20 | 1.43 | 1.23 | 1.04 | 1.39 |

Statistics

| | | D4: I am satisfied with the system's packaged software. | D5: I am satisfied with the system's processing speed. | D6: I am satisfied with the system's network environment | E1: I believe using ICT provided me with information that is useful | E2: I believe using ICT provided me with information that is accurate |
|----------------|---------|---|--|--|---|---|
| N | Valid | 331 | 332 | 332 | 332 | 332 |
| | Missing | 1 | 0 | 0 | 0 | 0 |
| Mean | | 3.22 | 2.93 | 3.19 | 3.76 | 3.75 |
| Median | | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 |
| Std. Deviation | | 1.08 | 1.25 | 1.12 | .97 | .92 |
| Variance | | 1.16 | 1.55 | 1.26 | .95 | .84 |

Statistics

| | | E3: I believe using ICT provided me with information at the right time | E4: I believe our IT personnel understand our business functions | E5: I believe our IT personnel understand the organisation's policies and laws | E6: I believe our IT personnel are free to assist users when needed |
|----------------|---------|--|--|--|---|
| N | Valid | 332 | 331 | 330 | 332 |
| | Missing | 0 | 1 | 2 | 0 |
| Mean | | 3.65 | 3.21 | 3.15 | 3.25 |
| Median | | 4.00 | 3.00 | 3.00 | 3.00 |
| Std. Deviation | | .98 | 1.06 | 1.05 | 1.03 |
| Variance | | .96 | 1.13 | 1.11 | 1.07 |

Statistics

| | | P1: After deploying ICTs at work, we can increase public participation | P2: After deploying ICTs at work, we can service customers much faster | P3: I believe ICT increased job productivity | P4: I believe ICT improved my judgment at work | P5: I believe ICT enabled me to do my job more quickly. |
|----------------|---------|--|--|--|--|---|
| N | Valid | 328 | 332 | 332 | 331 | 331 |
| | Missing | 4 | 0 | 0 | 1 | 1 |
| Mean | | 3.38 | 3.85 | 3.77 | 3.46 | 3.83 |
| Median | | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Std. Deviation | | 1.03 | .93 | .93 | 1.01 | .91 |
| Variance | | 1.05 | .86 | .86 | 1.03 | .82 |

Statistics

| | | P6: After deploying ICTs at work, we can deliver tailored services to citizens | W1: The Ministry of Finance's website has good information about all tax procedures | W2: I believe ICT reduced our interaction with citizens due to the web offered services | W3: The web information reduced my work as a tax advisor | W4: Putting all the tax material on the web was a good taxpayer teaching tool |
|----------------|---------|--|---|---|--|---|
| N | Valid | 329 | 328 | 328 | 329 | 331 |
| | Missing | 3 | 4 | 4 | 3 | 1 |
| Mean | | 3.65 | 3.59 | 2.96 | 2.82 | 3.16 |
| Median | | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 |
| Std. Deviation | | .90 | .92 | 1.09 | 1.10 | 1.02 |
| Variance | | .82 | .86 | 1.18 | 1.21 | 1.04 |

Frequency Table

B1: If I heard about a new information technology, I would look for ways to experiment with it

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 5 | 1.5 | 1.5 | 1.5 |
| | DISAGREE | 45 | 13.6 | 13.8 | 15.3 |
| | UNDECIDED | 52 | 15.7 | 16.0 | 31.3 |
| | AGREE | 158 | 47.6 | 48.5 | 79.8 |
| | STRONGLY AGREE | 66 | 19.9 | 20.2 | 100.0 |
| | Total | 326 | 98.2 | 100.0 | |
| Missing | System | 6 | 1.8 | | |
| Total | | 332 | 100.0 | | |

B2: Among my peers, I am usually the first to try out new information technology

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 20 | 6.0 | 6.2 | 6.2 |
| | DISAGREE | 88 | 26.5 | 27.1 | 33.2 |
| | UNDECIDED | 73 | 22.0 | 22.5 | 55.7 |
| | AGREE | 110 | 33.1 | 33.8 | 89.5 |
| | STRONGLY AGREE | 34 | 10.2 | 10.5 | 100.0 |
| | Total | 325 | 97.9 | 100.0 | |
| Missing | System | 7 | 2.1 | | |
| Total | | 332 | 100.0 | | |

B3: I like to experiment with new ICT

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 1 | .3 | .3 | .3 |
| | DISAGREE | 15 | 4.5 | 4.5 | 4.8 |
| | UNDECIDED | 25 | 7.5 | 7.6 | 12.4 |
| | AGREE | 161 | 48.5 | 48.6 | 61.0 |
| | STRONGLY AGREE | 129 | 38.9 | 39.0 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

B4: I think ICT can decrease bureaucracy

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 16 | 4.8 | 4.9 | 4.9 |
| | DISAGREE | 46 | 13.9 | 14.0 | 18.8 |
| | UNDECIDED | 72 | 21.7 | 21.9 | 40.7 |
| | AGREE | 126 | 38.0 | 38.3 | 79.0 |
| | STRONGLY AGREE | 69 | 20.8 | 21.0 | 100.0 |
| | Total | 329 | 99.1 | 100.0 | |
| Missing | System | 3 | .9 | | |
| Total | | 332 | 100.0 | | |

B5: I think ICT can promote fulfilment at work

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 3 | .9 | .9 | .9 |
| | DISAGREE | 19 | 5.7 | 5.7 | 6.6 |
| | UNDECIDED | 39 | 11.7 | 11.7 | 18.4 |
| | AGREE | 174 | 52.4 | 52.4 | 70.8 |
| | STRONGLY AGREE | 97 | 29.2 | 29.2 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

B6: I think ICT can foster social development

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 7 | 2.1 | 2.1 | 2.1 |
| | DISAGREE | 34 | 10.2 | 10.2 | 12.3 |
| | UNDECIDED | 43 | 13.0 | 13.0 | 25.3 |
| | AGREE | 141 | 42.5 | 42.5 | 67.8 |
| | STRONGLY AGREE | 107 | 32.2 | 32.2 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

C1: I believe that top management in our organization supports the ICT app

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 5 | 1.5 | 1.5 | 1.5 |
| | DISAGREE | 25 | 7.5 | 7.6 | 9.1 |
| | UNDECIDED | 48 | 14.5 | 14.5 | 23.6 |
| | AGREE | 179 | 53.9 | 54.1 | 77.6 |
| | STRONGLY AGREE | 74 | 22.3 | 22.4 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

C2: Our organisation offers various types of ICT training programs

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 14 | 4.2 | 4.2 | 4.2 |
| | DISAGREE | 65 | 19.6 | 19.7 | 23.9 |
| | UNDECIDED | 52 | 15.7 | 15.8 | 39.7 |
| | AGREE | 142 | 42.8 | 43.0 | 82.7 |
| | STRONGLY AGREE | 57 | 17.2 | 17.3 | 100.0 |
| | Total | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

C3: The training programs conducted were job related

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 16 | 4.8 | 4.8 | 4.8 |
| | DISAGREE | 52 | 15.7 | 15.8 | 20.6 |
| | UNDECIDED | 55 | 16.6 | 16.7 | 37.3 |
| | AGREE | 159 | 47.9 | 48.2 | 85.5 |
| | STRONGLY AGREE | 48 | 14.5 | 14.5 | 100.0 |
| | Total | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

C4: Our organisation appraises ICT literacy of employees

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 78 | 23.5 | 23.6 | 23.6 |
| | DISAGREE | 119 | 35.8 | 36.0 | 59.5 |
| | UNDECIDED | 72 | 21.7 | 21.8 | 81.3 |
| | AGREE | 51 | 15.4 | 15.4 | 96.7 |
| | STRONGLY AGREE | 11 | 3.3 | 3.3 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

C5: Our organization evaluates the ICT applications that we work with regularly

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 38 | 11.4 | 11.5 | 11.5 |
| | DISAGREE | 93 | 28.0 | 28.2 | 39.7 |
| | UNDECIDED | 91 | 27.4 | 27.6 | 67.3 |
| | AGREE | 92 | 27.7 | 27.9 | 95.2 |
| | STRONGLY AGREE | 16 | 4.8 | 4.8 | 100.0 |
| | Total | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

C6: Our ICT service desk does a great job in answering ICT related problems

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 56 | 16.9 | 16.9 | 16.9 |
| | DISAGREE | 64 | 19.3 | 19.3 | 36.3 |
| | UNDECIDED | 104 | 31.3 | 31.4 | 67.7 |
| | AGREE | 80 | 24.1 | 24.2 | 91.8 |
| | STRONGLY AGREE | 27 | 8.1 | 8.2 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

D1: I am satisfied with the reliability of the system.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 21 | 6.3 | 6.3 | 6.3 |
| | DISAGREE | 51 | 15.4 | 15.4 | 21.7 |
| | UNDECIDED | 47 | 14.2 | 14.2 | 35.8 |
| | AGREE | 165 | 49.7 | 49.7 | 85.5 |
| | STRONGLY AGREE | 48 | 14.5 | 14.5 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

D2: I am satisfied with the system's ease of use.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 11 | 3.3 | 3.3 | 3.3 |
| | DISAGREE | 48 | 14.5 | 14.5 | 17.8 |
| | UNDECIDED | 46 | 13.9 | 13.9 | 31.6 |
| | AGREE | 174 | 52.4 | 52.4 | 84.0 |
| | STRONGLY AGREE | 53 | 16.0 | 16.0 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

D3: I am satisfied that the system is always accessible.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 27 | 8.1 | 8.2 | 8.2 |
| | DISAGREE | 78 | 23.5 | 23.6 | 31.7 |
| | UNDECIDED | 52 | 15.7 | 15.7 | 47.4 |
| | AGREE | 134 | 40.4 | 40.5 | 87.9 |
| | STRONGLY AGREE | 40 | 12.0 | 12.1 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

D4: I am satisfied with the system's packaged software.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 21 | 6.3 | 6.3 | 6.3 |
| | DISAGREE | 69 | 20.8 | 20.8 | 27.2 |
| | UNDECIDED | 87 | 26.2 | 26.3 | 53.5 |
| | AGREE | 123 | 37.0 | 37.2 | 90.6 |
| | STRONGLY AGREE | 31 | 9.3 | 9.4 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

D5: I am satisfied with the system's processing speed.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 49 | 14.8 | 14.8 | 14.8 |
| | DISAGREE | 95 | 28.6 | 28.6 | 43.4 |
| | UNDECIDED | 47 | 14.2 | 14.2 | 57.5 |
| | AGREE | 113 | 34.0 | 34.0 | 91.6 |
| | STRONGLY AGREE | 28 | 8.4 | 8.4 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

D6: I am satisfied with the system's network environment

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 26 | 7.8 | 7.8 | 7.8 |
| | DISAGREE | 74 | 22.3 | 22.3 | 30.1 |
| | UNDECIDED | 76 | 22.9 | 22.9 | 53.0 |
| | AGREE | 124 | 37.3 | 37.3 | 90.4 |
| | STRONGLY AGREE | 32 | 9.6 | 9.6 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

E1: I believe using ICT provided me with information that is useful

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 38 | 11.4 | 11.4 | 14.2 |
| | UNDECIDED | 38 | 11.4 | 11.4 | 25.6 |
| | AGREE | 185 | 55.7 | 55.7 | 81.3 |
| | STRONGLY AGREE | 62 | 18.7 | 18.7 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

E2: I believe using ICT provided me with information that is accurate

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 8 | 2.4 | 2.4 | 2.4 |
| | DISAGREE | 29 | 8.7 | 8.7 | 11.1 |
| | UNDECIDED | 57 | 17.2 | 17.2 | 28.3 |
| | AGREE | 183 | 55.1 | 55.1 | 83.4 |
| | STRONGLY AGREE | 55 | 16.6 | 16.6 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

E3: I believe using ICT provided me with information at the right time

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 40 | 12.0 | 12.0 | 14.8 |
| | UNDECIDED | 64 | 19.3 | 19.3 | 34.0 |
| | AGREE | 165 | 49.7 | 49.7 | 83.7 |
| | STRONGLY AGREE | 54 | 16.3 | 16.3 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

E4: I believe our IT personnel understand our business functions

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 19 | 5.7 | 5.7 | 5.7 |
| | DISAGREE | 66 | 19.9 | 19.9 | 25.7 |
| | UNDECIDED | 107 | 32.2 | 32.3 | 58.0 |
| | AGREE | 103 | 31.0 | 31.1 | 89.1 |
| | STRONGLY AGREE | 36 | 10.8 | 10.9 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

E5: I believe our IT personnel understand the organisation's policies and laws

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 27 | 8.1 | 8.2 | 8.2 |
| | DISAGREE | 55 | 16.6 | 16.7 | 24.8 |
| | UNDECIDED | 115 | 34.6 | 34.8 | 59.7 |
| | AGREE | 108 | 32.5 | 32.7 | 92.4 |
| | STRONGLY AGREE | 25 | 7.5 | 7.6 | 100.0 |
| | Total | 330 | 99.4 | 100.0 | |
| Missing | System | 2 | .6 | | |
| Total | | 332 | 100.0 | | |

E6: I believe our IT personnel are free to assist users when needed

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 19 | 5.7 | 5.7 | 5.7 |
| | DISAGREE | 61 | 18.4 | 18.4 | 24.1 |
| | UNDECIDED | 98 | 29.5 | 29.5 | 53.6 |
| | AGREE | 126 | 38.0 | 38.0 | 91.6 |
| | STRONGLY AGREE | 28 | 8.4 | 8.4 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

P1: After deploying ICTs at work, we can increase public participation

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 14 | 4.2 | 4.3 | 4.3 |
| | DISAGREE | 57 | 17.2 | 17.4 | 21.6 |
| | UNDECIDED | 80 | 24.1 | 24.4 | 46.0 |
| | AGREE | 143 | 43.1 | 43.6 | 89.6 |
| | STRONGLY AGREE | 34 | 10.2 | 10.4 | 100.0 |
| | Total | 328 | 98.8 | 100.0 | |
| Missing | System | 4 | 1.2 | | |
| Total | | 332 | 100.0 | | |

P2: After deploying ICTs at work, we can service customers much faster

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 6 | 1.8 | 1.8 | 1.8 |
| | DISAGREE | 29 | 8.7 | 8.7 | 10.5 |
| | UNDECIDED | 48 | 14.5 | 14.5 | 25.0 |
| | AGREE | 174 | 52.4 | 52.4 | 77.4 |
| | STRONGLY AGREE | 75 | 22.6 | 22.6 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

P3: I believe ICT increased job productivity

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 5 | 1.5 | 1.5 | 1.5 |
| | DISAGREE | 37 | 11.1 | 11.1 | 12.7 |
| | UNDECIDED | 48 | 14.5 | 14.5 | 27.1 |
| | AGREE | 180 | 54.2 | 54.2 | 81.3 |
| | STRONGLY AGREE | 62 | 18.7 | 18.7 | 100.0 |
| | Total | 332 | 100.0 | 100.0 | |

P4: I believe ICT improved my judgment at work

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 13 | 3.9 | 3.9 | 3.9 |
| | DISAGREE | 53 | 16.0 | 16.0 | 19.9 |
| | UNDECIDED | 69 | 20.8 | 20.8 | 40.8 |
| | AGREE | 160 | 48.2 | 48.3 | 89.1 |
| | STRONGLY AGREE | 36 | 10.8 | 10.9 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

P5: I believe ICT enabled me to do my job more quickly.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 24 | 7.2 | 7.3 | 10.0 |
| | UNDECIDED | 43 | 13.0 | 13.0 | 23.0 |
| | AGREE | 194 | 58.4 | 58.6 | 81.6 |
| | STRONGLY AGREE | 61 | 18.4 | 18.4 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

P6: After deploying ICTs at work, we can deliver tailored services to citizens

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 6 | 1.8 | 1.8 | 1.8 |
| | DISAGREE | 34 | 10.2 | 10.3 | 12.2 |
| | UNDECIDED | 73 | 22.0 | 22.2 | 34.3 |
| | AGREE | 171 | 51.5 | 52.0 | 86.3 |
| | STRONGLY AGREE | 45 | 13.6 | 13.7 | 100.0 |
| | Total | 329 | 99.1 | 100.0 | |
| Missing | System | 3 | .9 | | |
| Total | | 332 | 100.0 | | |

W1: The Ministry of Finance's website has good information about all tax procedures

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 9 | 2.7 | 2.7 | 2.7 |
| | DISAGREE | 33 | 9.9 | 10.1 | 12.8 |
| | UNDECIDED | 83 | 25.0 | 25.3 | 38.1 |
| | AGREE | 163 | 49.1 | 49.7 | 87.8 |
| | STRONGLY AGREE | 40 | 12.0 | 12.2 | 100.0 |
| | Total | 328 | 98.8 | 100.0 | |
| Missing | System | 4 | 1.2 | | |
| Total | | 332 | 100.0 | | |

W2: I believe ICT reduced our interaction with citizens due to the web offered services

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 34 | 10.2 | 10.4 | 10.4 |
| | DISAGREE | 79 | 23.8 | 24.1 | 34.5 |
| | UNDECIDED | 100 | 30.1 | 30.5 | 64.9 |
| | AGREE | 96 | 28.9 | 29.3 | 94.2 |
| | STRONGLY AGREE | 19 | 5.7 | 5.8 | 100.0 |
| | Total | 328 | 98.8 | 100.0 | |
| Missing | System | 4 | 1.2 | | |
| Total | | 332 | 100.0 | | |

W3: The web information reduced my work as a tax advisor

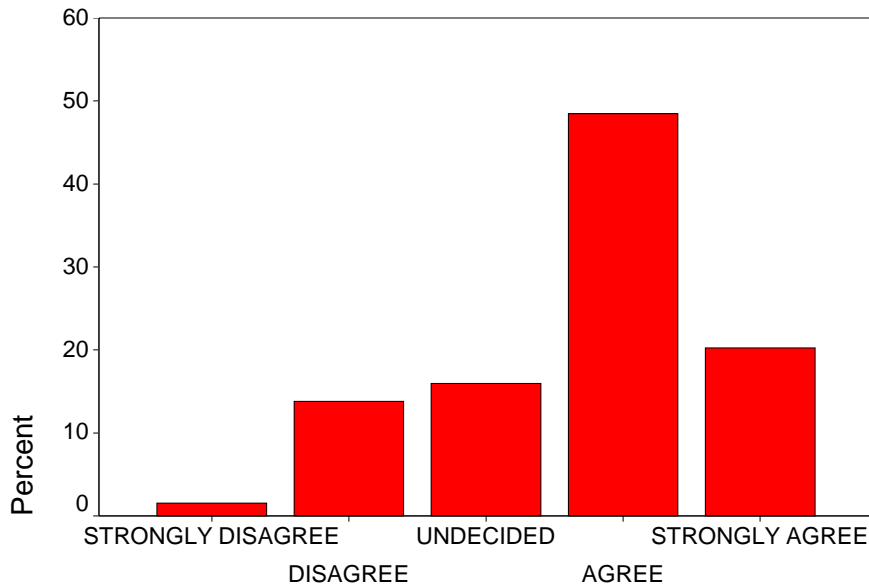
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 46 | 13.9 | 14.0 | 14.0 |
| | DISAGREE | 81 | 24.4 | 24.6 | 38.6 |
| | UNDECIDED | 104 | 31.3 | 31.6 | 70.2 |
| | AGREE | 83 | 25.0 | 25.2 | 95.4 |
| | STRONGLY AGREE | 15 | 4.5 | 4.6 | 100.0 |
| | Total | 329 | 99.1 | 100.0 | |
| Missing | System | 3 | .9 | | |
| Total | | 332 | 100.0 | | |

W4: Putting all the tax material on the web was a good taxpayer teaching tool

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-------------------|-----------|---------|---------------|--------------------|
| Valid | STRONGLY DISAGREE | 22 | 6.6 | 6.6 | 6.6 |
| | DISAGREE | 61 | 18.4 | 18.4 | 25.1 |
| | UNDECIDED | 113 | 34.0 | 34.1 | 59.2 |
| | AGREE | 113 | 34.0 | 34.1 | 93.4 |
| | STRONGLY AGREE | 22 | 6.6 | 6.6 | 100.0 |
| | Total | 331 | 99.7 | 100.0 | |
| Missing | System | 1 | .3 | | |
| Total | | 332 | 100.0 | | |

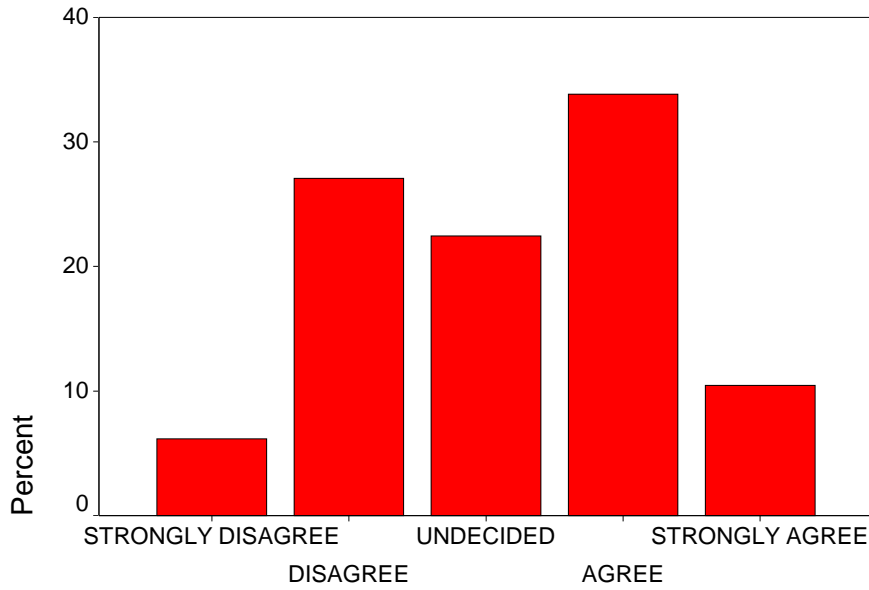
Bar Chart

B1: If I heard about a new information techn



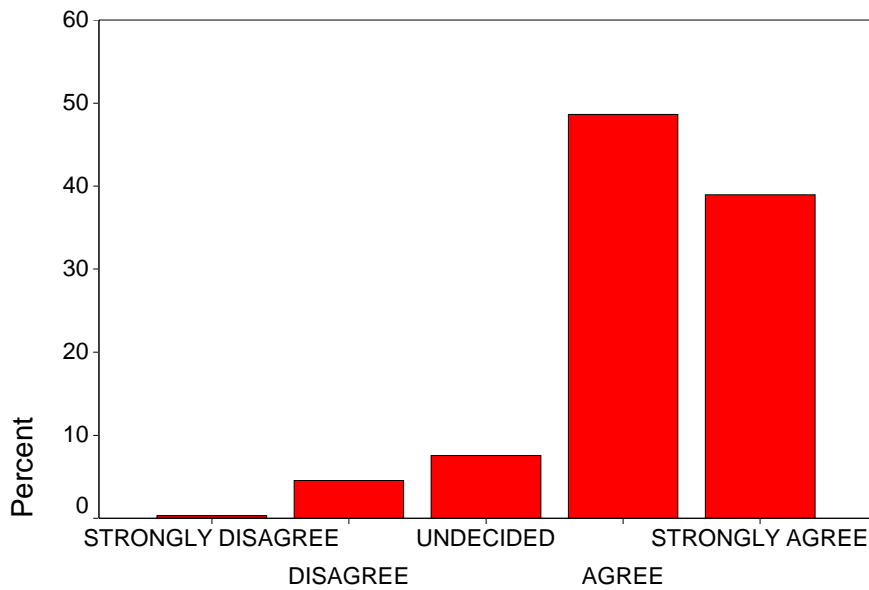
B1: If I heard about a new information technology, I would look

B2: Among my peers, I am usually the first to



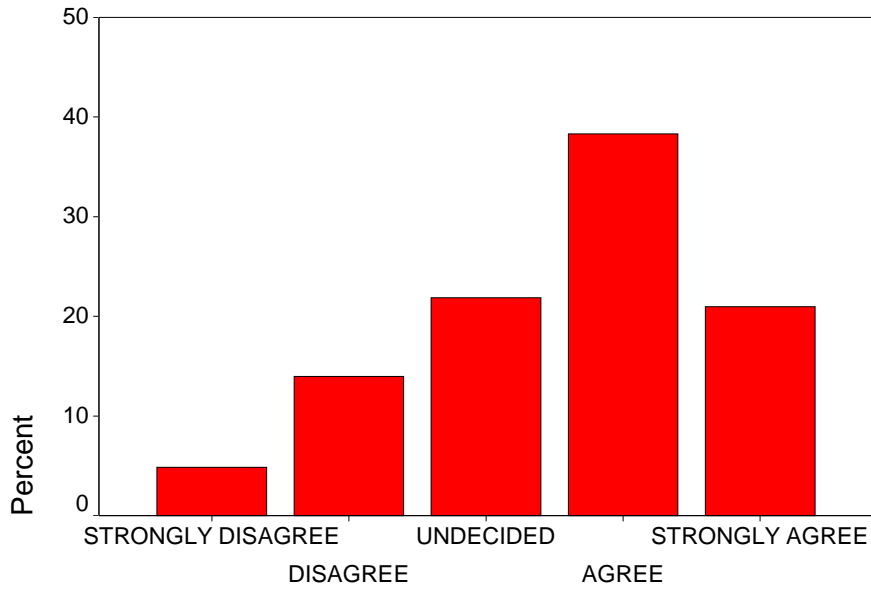
B2: Among my peers, I am usually the first to try out new infor

B3: I like to experiment with new ICT



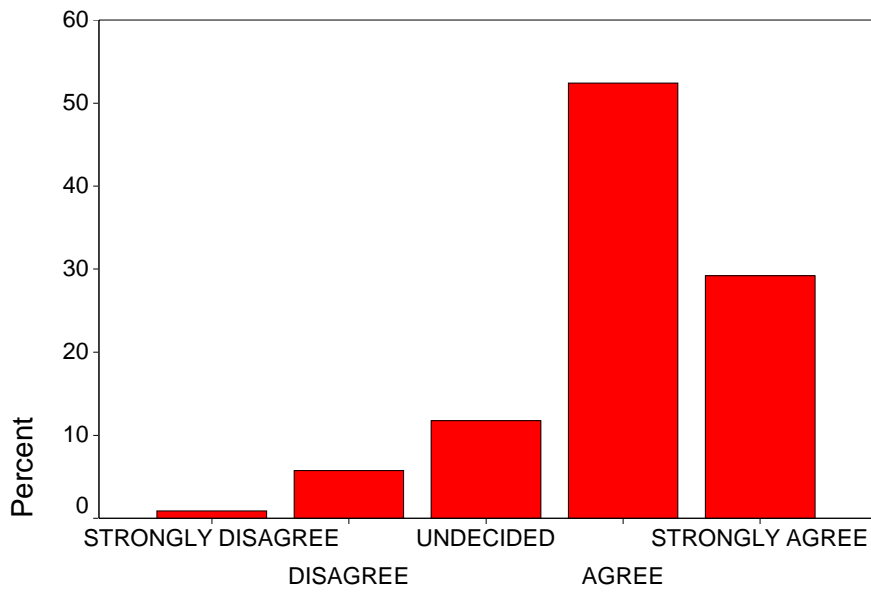
B3: I like to experiment with new ICT

B4: I think ICT can decrease bureaucracy



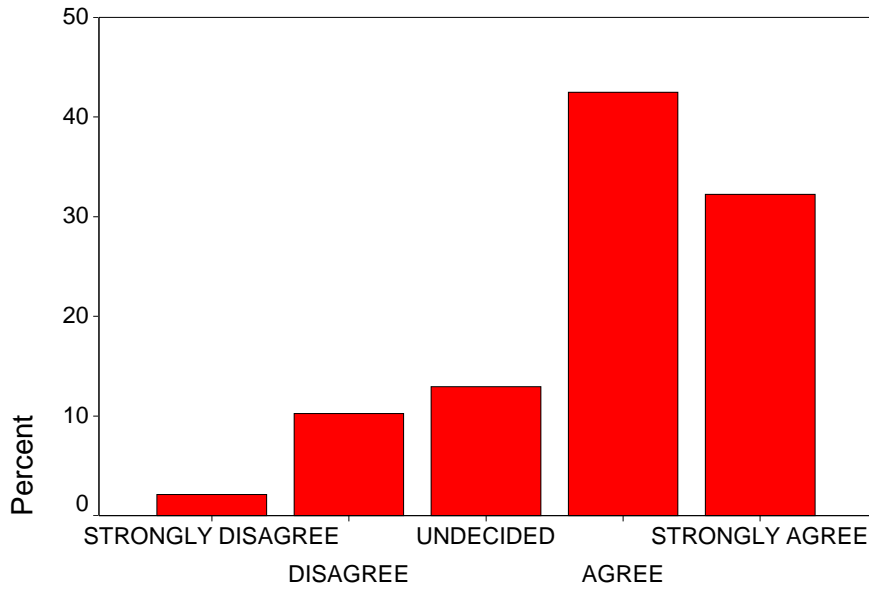
B4: I think ICT can decrease bureaucracy

B5: I think ICT can promote fulfilment at work



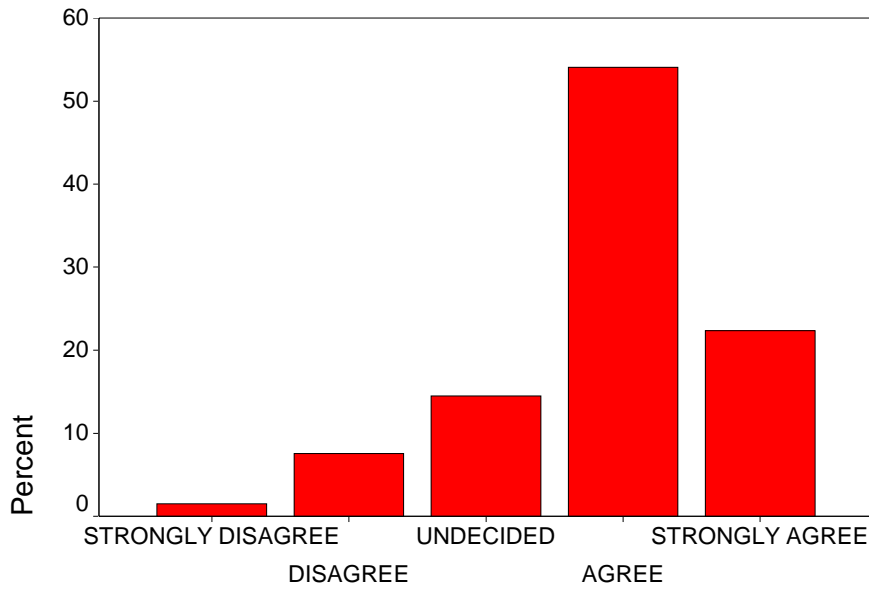
B5: I think ICT can promote fulfilment at work

B6: I think ICT can foster social development



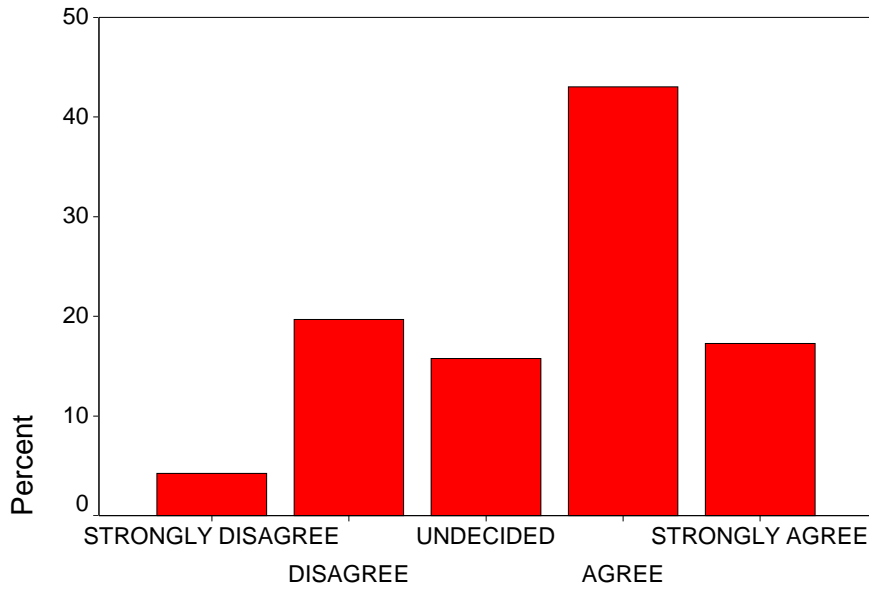
B6: I think ICT can foster social development

C1: I believe that top management in our organization support



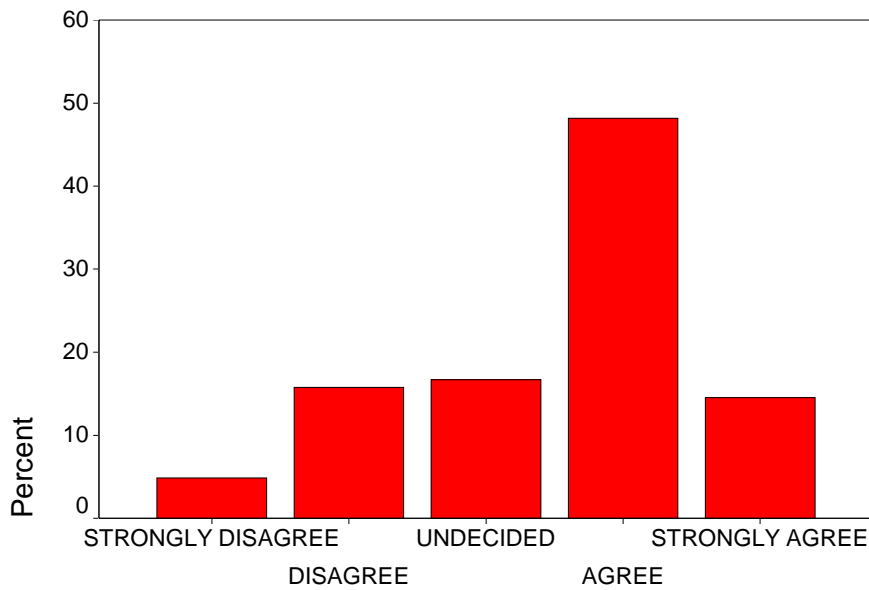
C1: I believe that top management in our organization support

C2: Our organisation offers various types of



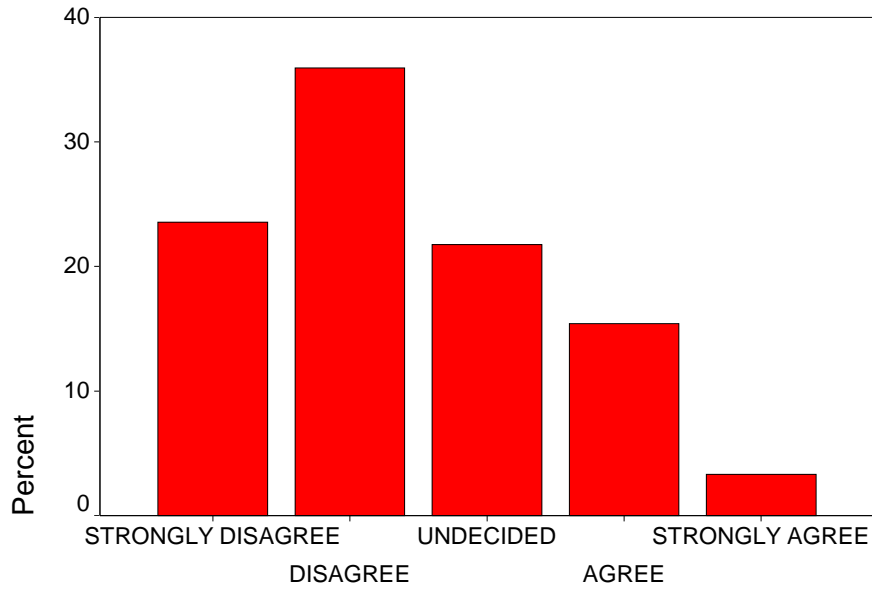
C2: Our organisation offers various types of ICT training progr

C3: The training programs conducted were j



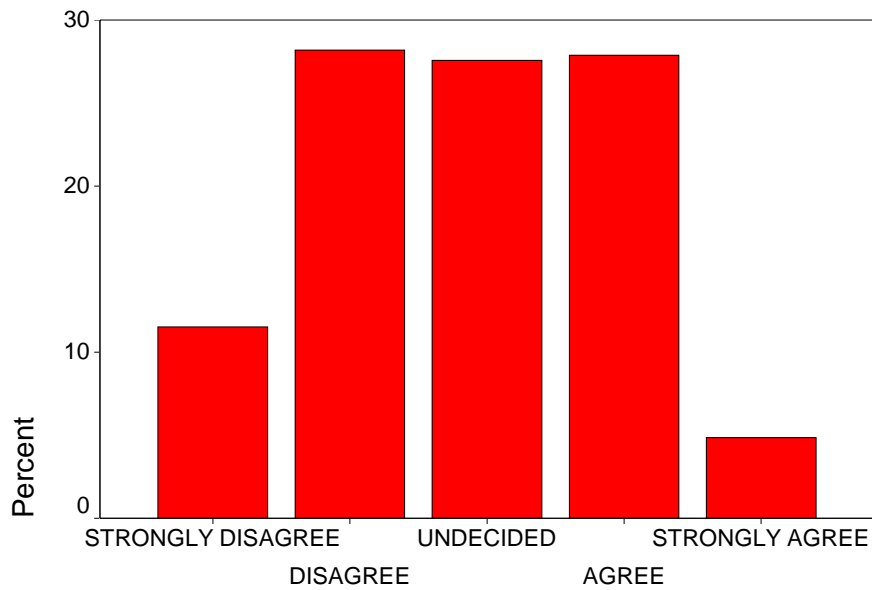
C3: The training programs conducted were job related

C4: Our organisation appraises ICT literacy



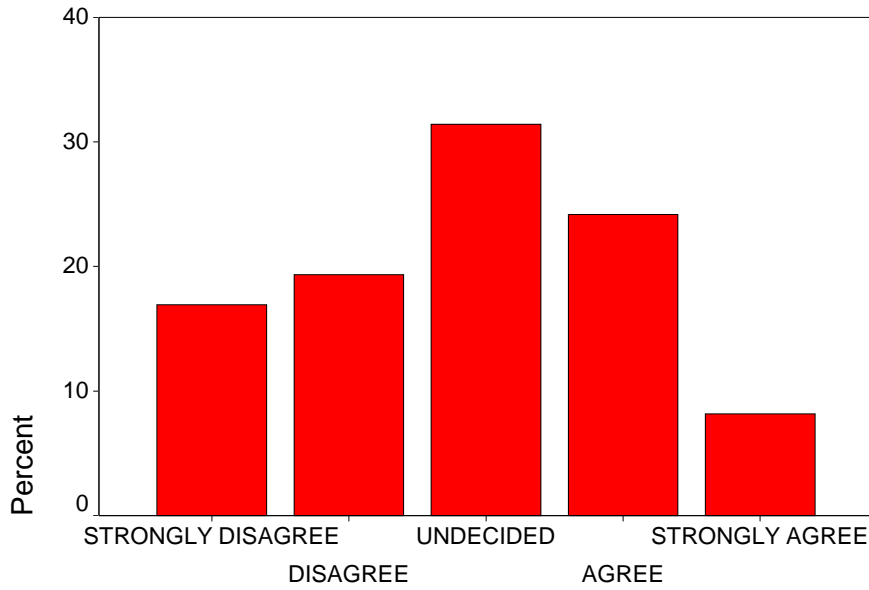
C4: Our organisation appraises ICT literacy of employees

C5: Our organization evaluates the ICT appl



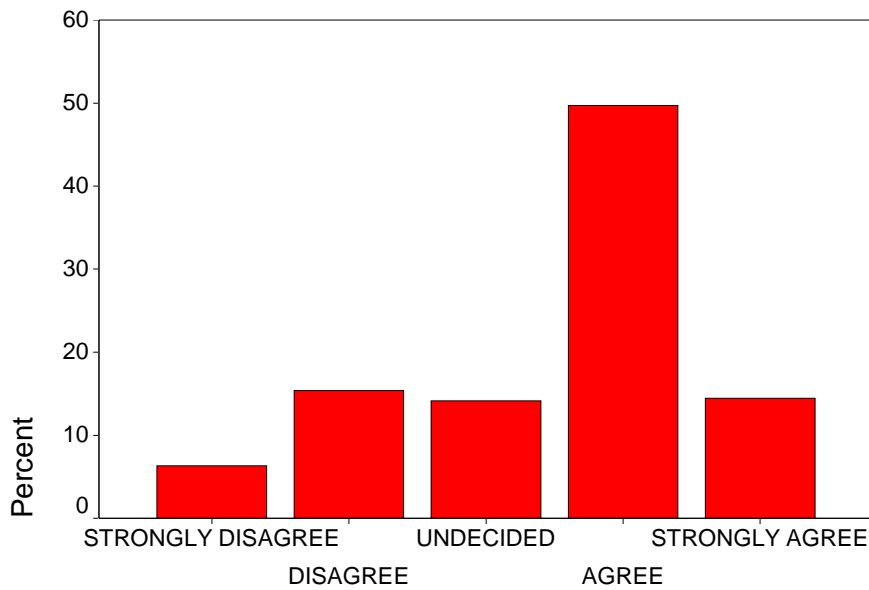
C5: Our organization evaluates the ICT applications that we w

C6: Our ICT service desk does a great job in



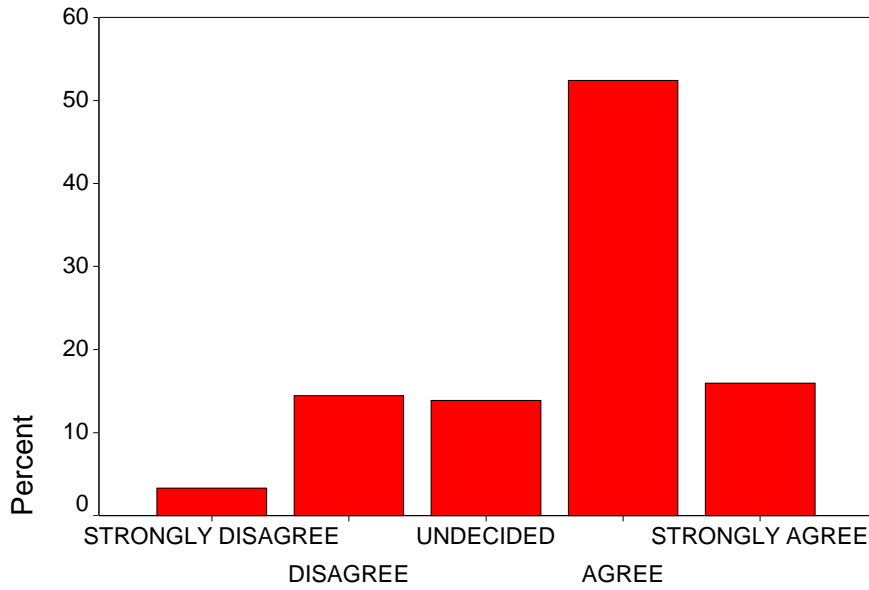
C6: Our ICT service desk does a great job in answering ICT re

D1: I am satisfied with the reliability of the sy



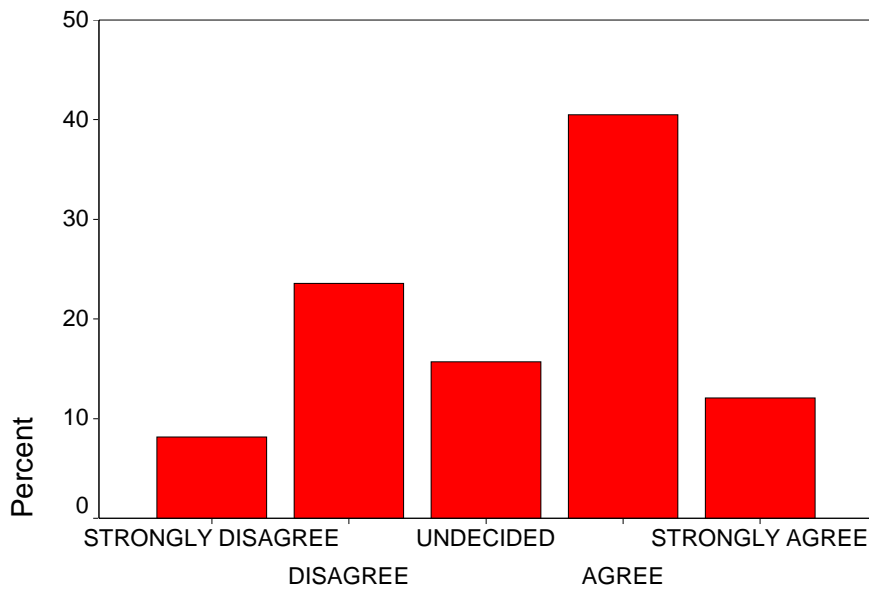
D1: I am satisfied with the reliability of the system.

D2: I am satisfied with the system's ease of



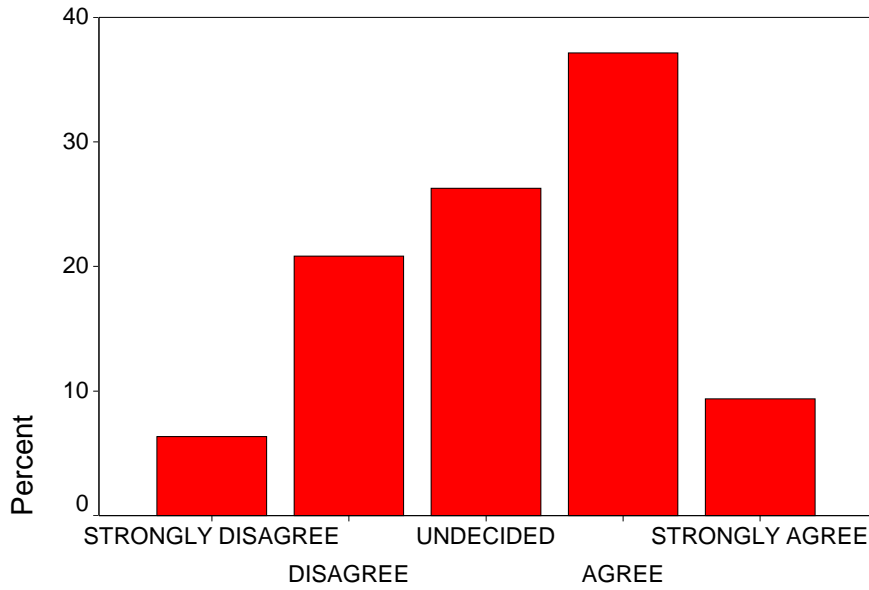
D2: I am satisfied with the system's ease of use.

D3: I am satisfied that the system is always



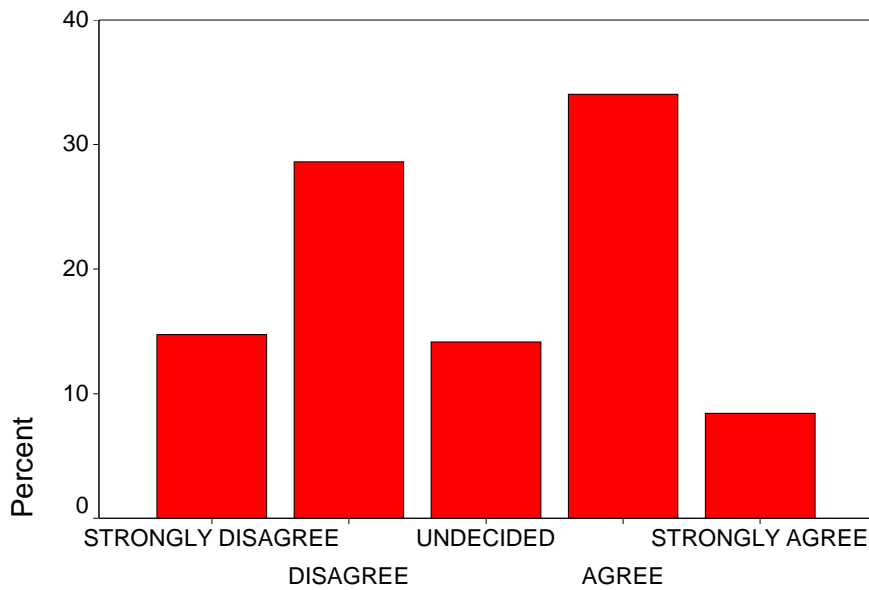
D3: I am satisfied that the system is always accessible.

D4: I am satisfied with the system's package



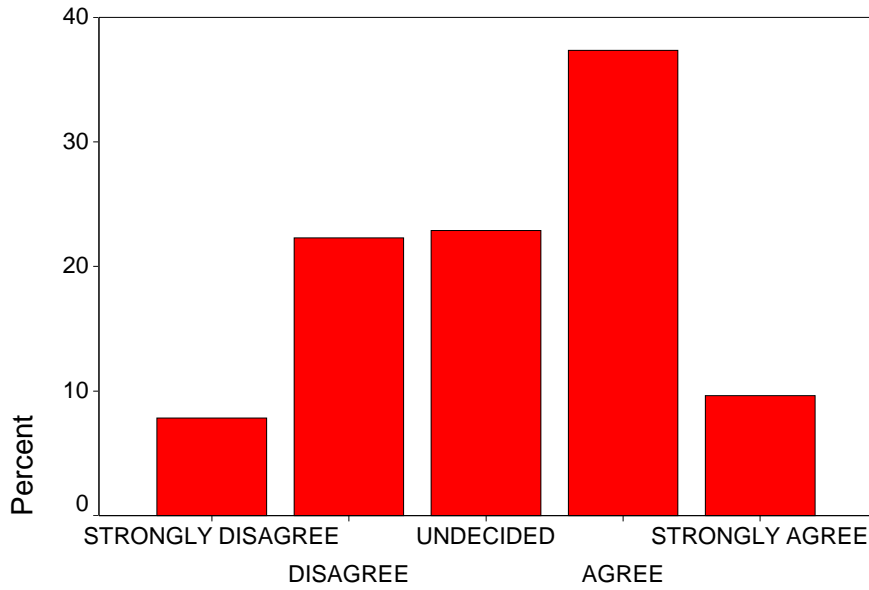
D4: I am satisfied with the system's packaged software.

D5: I am satisfied with the system's processing speed



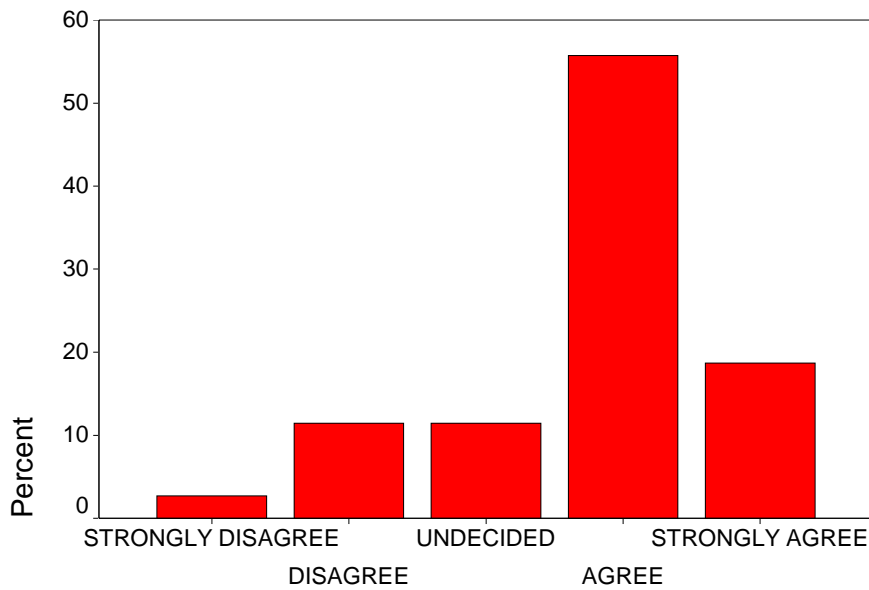
D5: I am satisfied with the system's processing speed.

D6: I am satisfied with the system's network



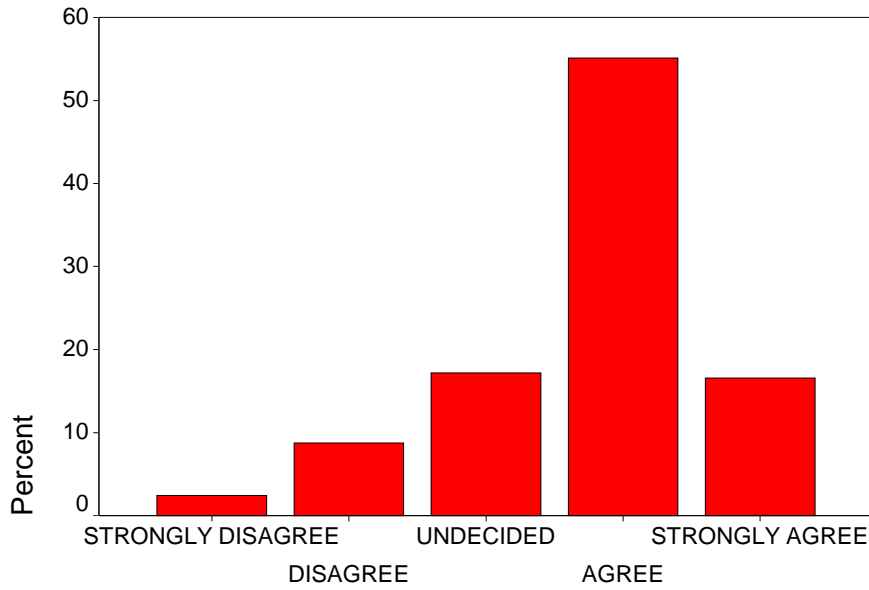
D6: I am satisfied with the system's network environment

E1: I believe using ICT provided me with information that is useful



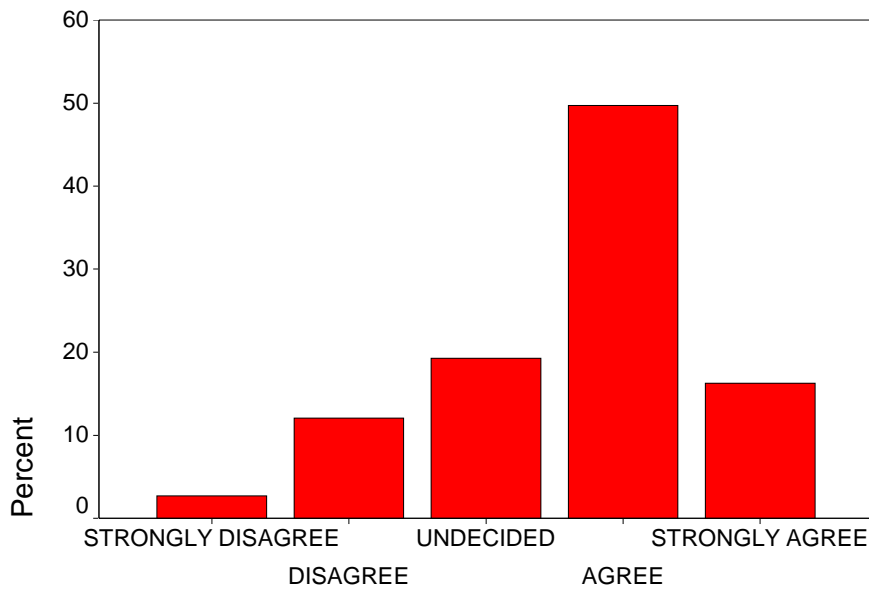
E1: I believe using ICT provided me with information that is useful to me

E2: I believe using ICT provided me with info



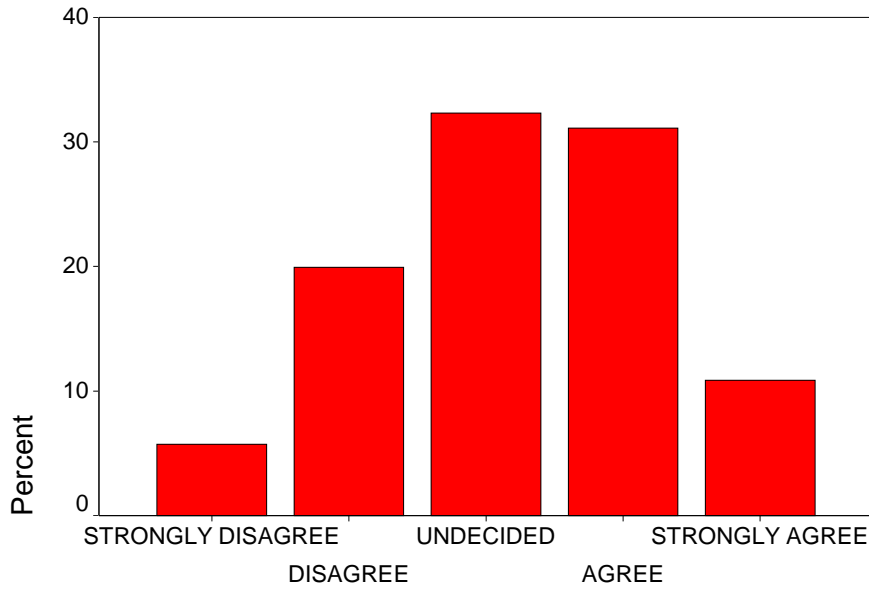
E2: I believe using ICT provided me with information that is ac

E3: I believe using ICT provided me with info



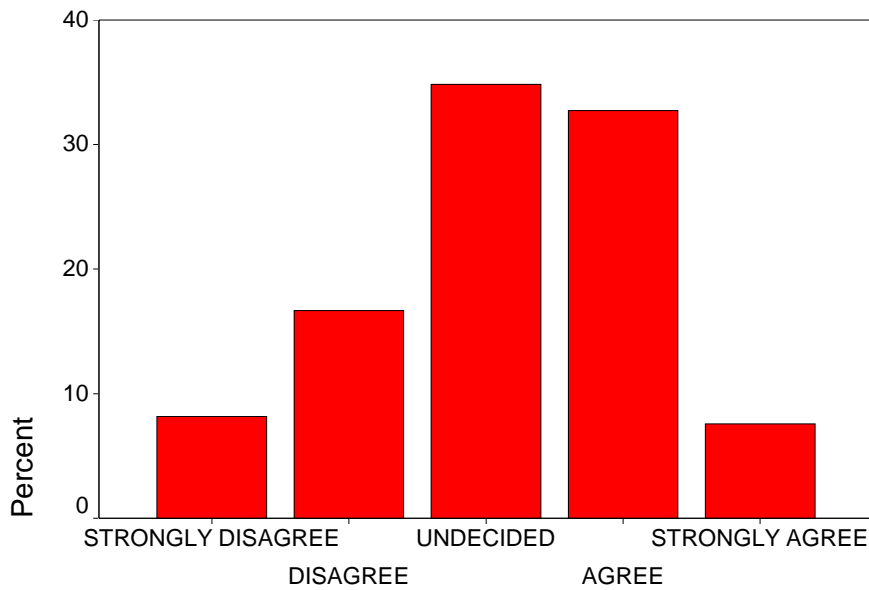
E3: I believe using ICT provided me with information at the rig

E4: I believe our IT personnel understand our business functions



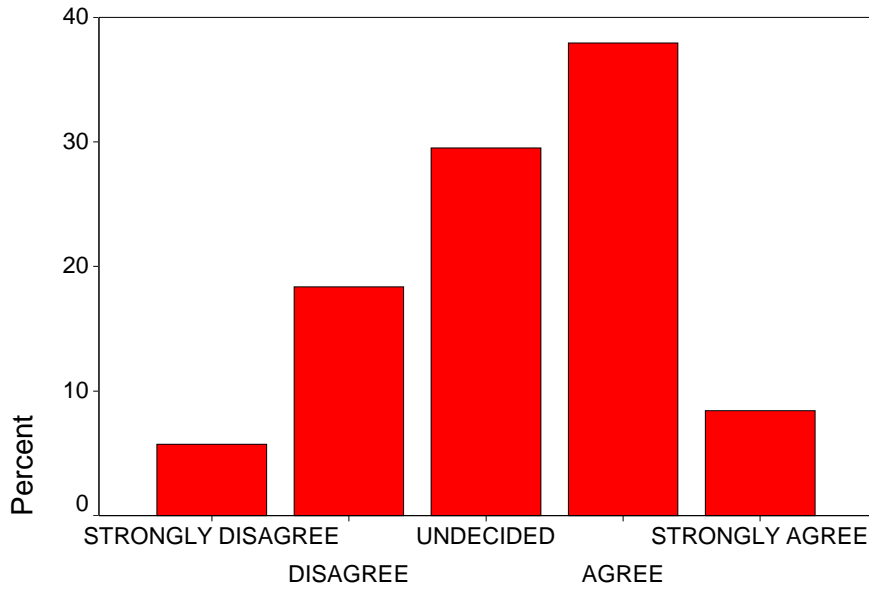
E4: I believe our IT personnel understand our business functions

E5: I believe our IT personnel understand the organisation's processes



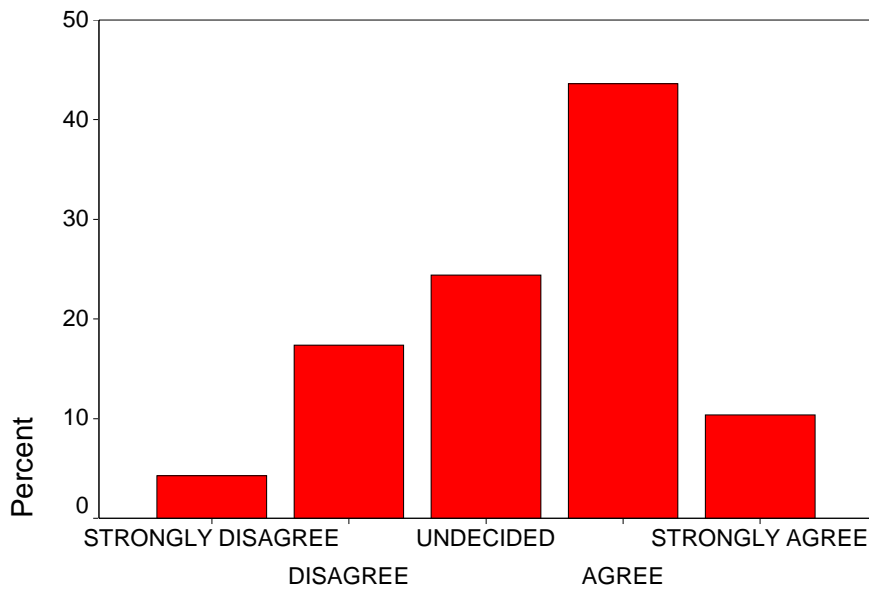
E5: I believe our IT personnel understand the organisation's processes

E6: I believe our IT personnel are free to assist users when ne



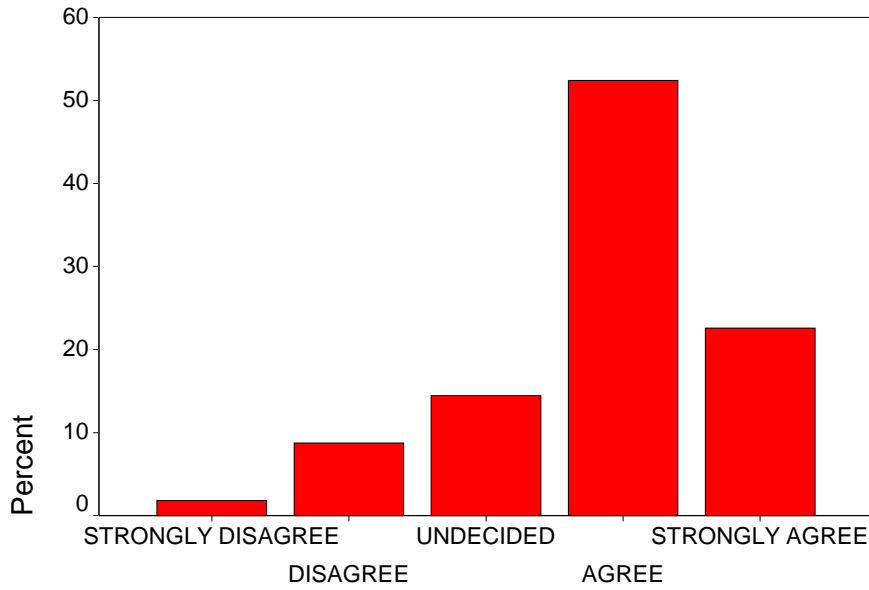
E6: I believe our IT personnel are free to assist users when ne

P1: After deploying ICTs at work, we can inc



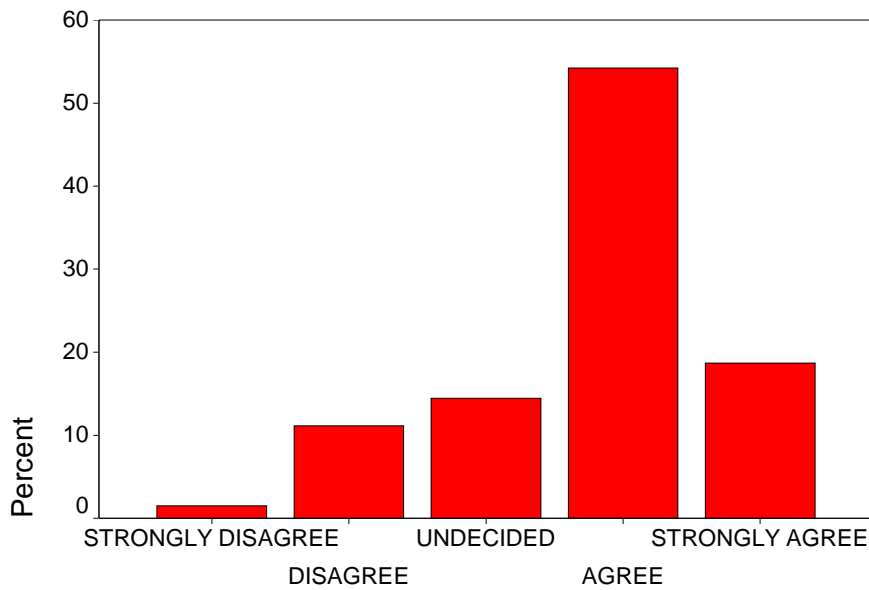
P1: After deploying ICTs at work, we can increase public parti

P2: After deploying ICTs at work, we can see



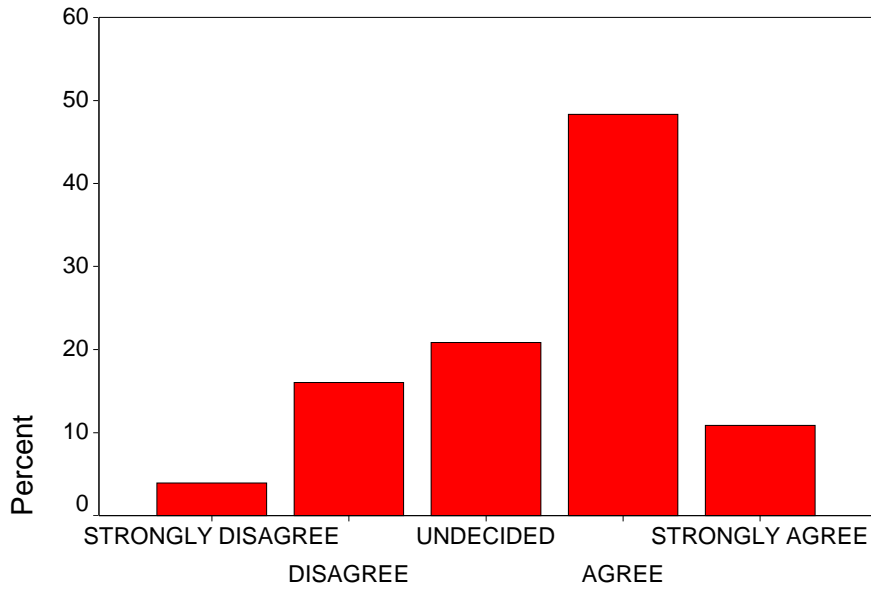
P2: After deploying ICTs at work, we can service customers more

P3: I believe ICT increased job productivity



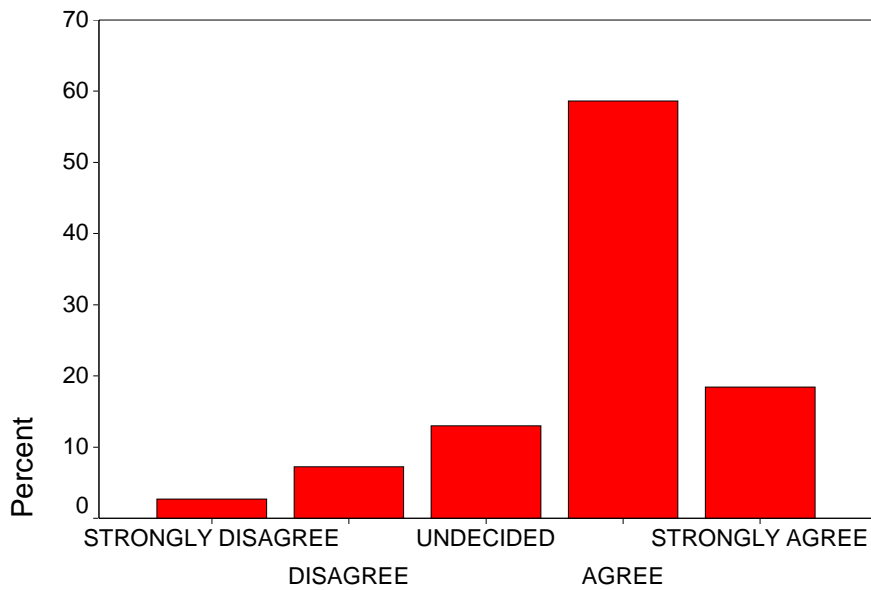
P3: I believe ICT increased job productivity

P4: I believe ICT improved my judgment at work



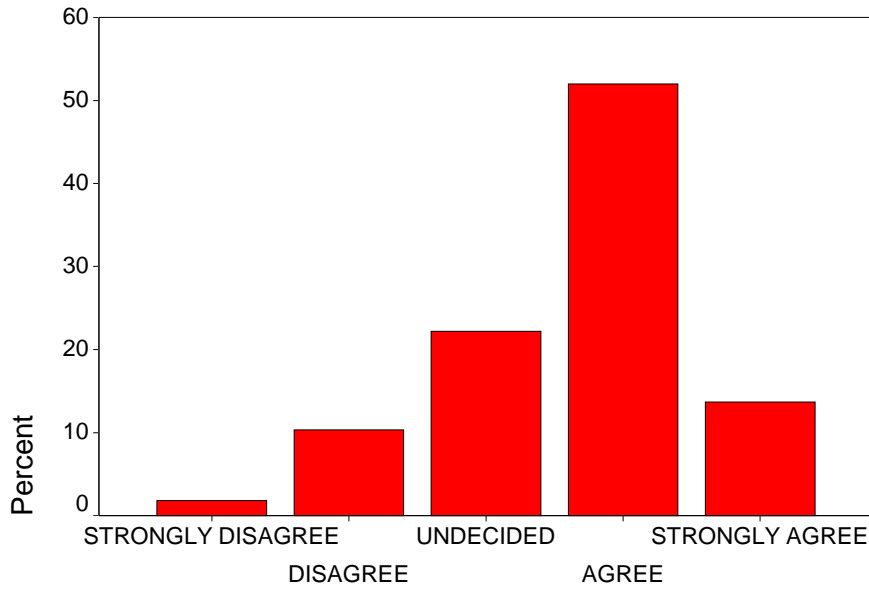
P4: I believe ICT improved my judgment at work

P5: I believe ICT enabled me to do my job more quickly.



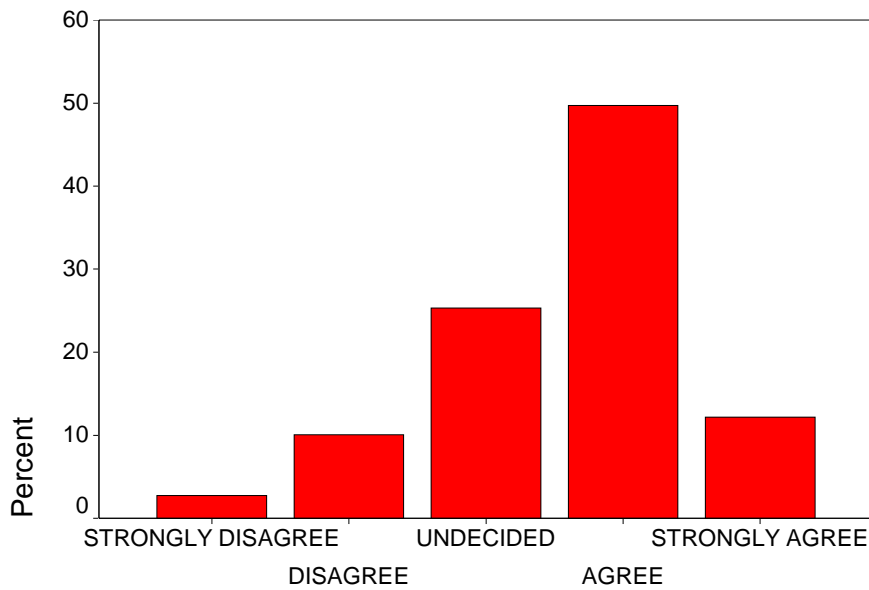
P5: I believe ICT enabled me to do my job more quickly.

P6: After deploying ICTs at work, we can de



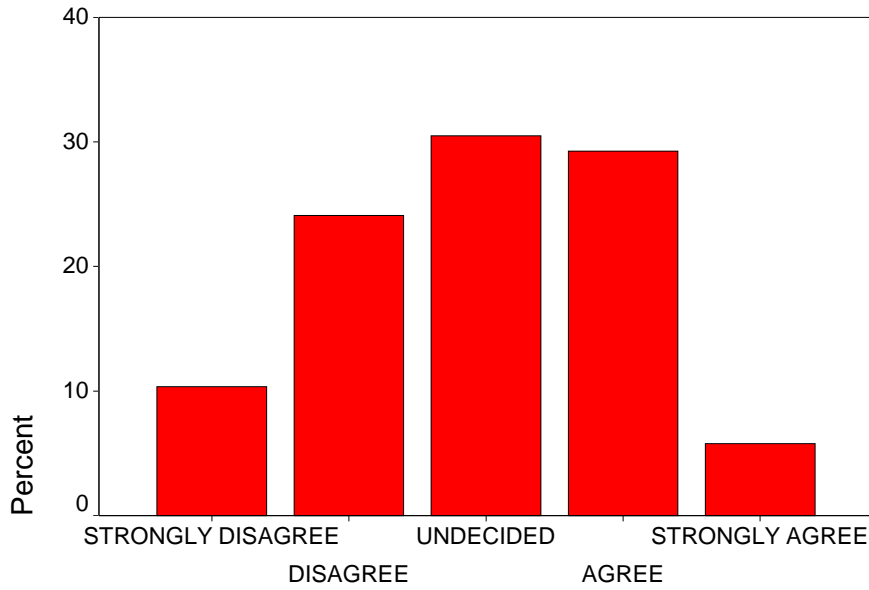
P6: After deploying ICTs at work, we can deliver tailored servi

W1: The Ministry of Finance's website has g



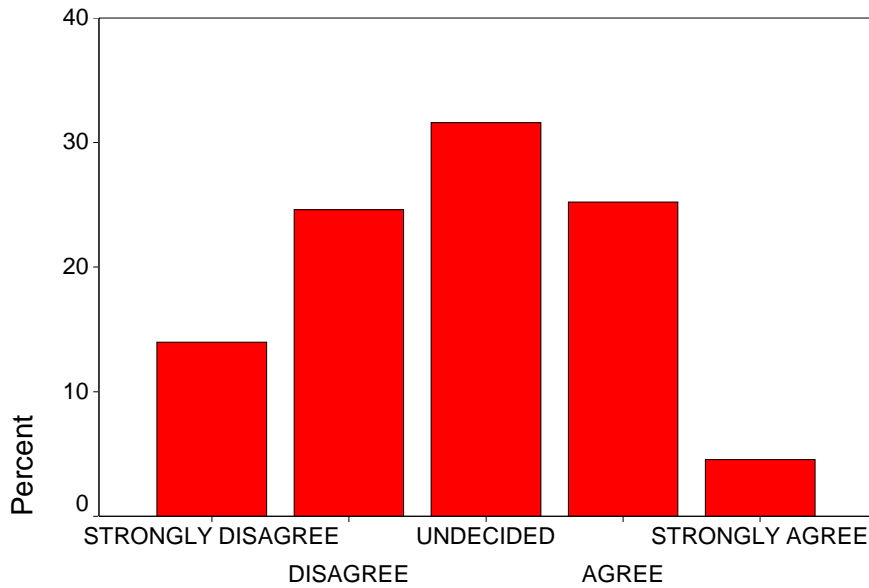
W1: The Ministry of Finance's website has good information a

W2: I believe ICT reduced our interaction with citizens due to 1



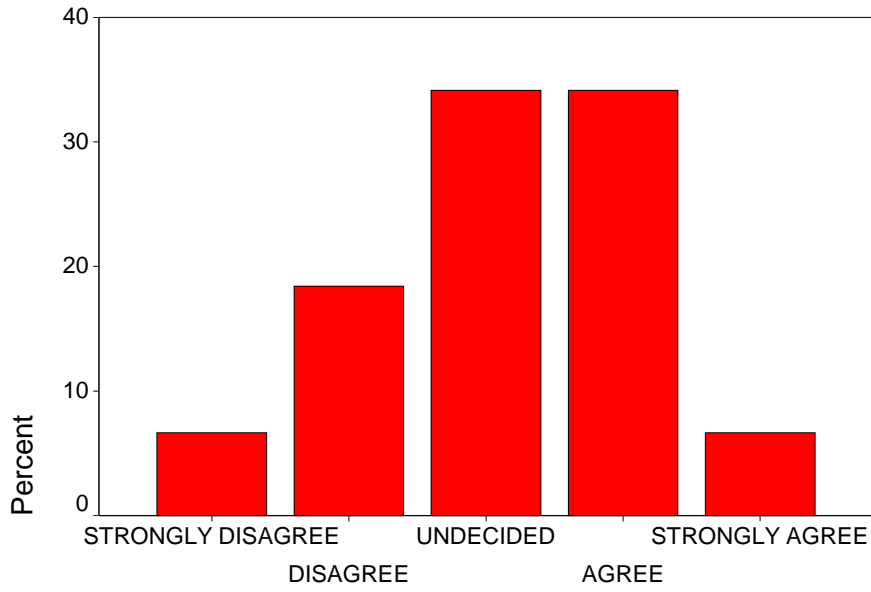
W2: I believe ICT reduced our interaction with citizens due to 1

W3: The web information reduced my work as a tax advisor



W3: The web information reduced my work as a tax advisor

W4: Putting all the tax material on the web v



W4: Putting all the tax material on the web was a good taxpay

APPENDIX SPSS

10

REGRESSION ON BCD AND E

REGRESSION

```

/DESCRIPTIVES MEAN STDDEV CORR SIG N
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT efactor
/METHOD=STEPWISE bfactor cfactor dfactor
/RESIDUALS HIST(ZRESID) .
    
```

Regression

Descriptive Statistics

| | Mean | Std. Deviation | N |
|--------------------------|-----------|----------------|-----|
| software quality | -7.07E-03 | 1.0076213 | 297 |
| ICT cognition | -2.41E-03 | .9904614 | 297 |
| Institutional properties | -8.58E-03 | 1.0023099 | 297 |
| ICT environments | -1.81E-03 | 1.0065937 | 297 |

Correlations

| | | software quality | ICT cognition | Institutional properties | ICT environments |
|---------------------|--------------------------|------------------|---------------|--------------------------|------------------|
| Pearson Correlation | software quality | 1.000 | .145 | .376 | .480 |
| | ICT cognition | .145 | 1.000 | -.004 | -.020 |
| | Institutional properties | .376 | -.004 | 1.000 | .015 |
| | ICT environments | .480 | -.020 | .015 | 1.000 |
| Sig. (1-tailed) | software quality | . | .006 | .000 | .000 |
| | ICT cognition | .006 | . | .471 | .363 |
| | Institutional properties | .000 | .471 | . | .396 |
| | ICT environments | .000 | .363 | .396 | . |
| N | software quality | 297 | 297 | 297 | 297 |
| | ICT cognition | 297 | 297 | 297 | 297 |
| | Institutional properties | 297 | 297 | 297 | 297 |
| | ICT environments | 297 | 297 | 297 | 297 |

Variables Entered/Removed^a

| Model | Variables Entered | Variables Removed | Method |
|-------|--------------------------|-------------------|---|
| 1 | ICT environments | . | Stepwise (Criteria: Probability -of-F-to-enter <= .050, Probability -of-F-to-remove >= .100). |
| 2 | Institutional properties | . | Stepwise (Criteria: Probability -of-F-to-enter <= .050, Probability -of-F-to-remove >= .100). |
| 3 | ICT cognition | . | Stepwise (Criteria: Probability -of-F-to-enter <= .050, Probability -of-F-to-remove >= .100). |

a. Dependent Variable: software quality

Model Summary^d

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .480 ^a | .230 | .228 | .8855076 |
| 2 | .605 ^b | .366 | .362 | .8049218 |
| 3 | .625 ^c | .391 | .384 | .7905609 |

a. Predictors: (Constant), ICT environments

b. Predictors: (Constant), ICT environments, Institutional properties

c. Predictors: (Constant), ICT environments, Institutional properties, ICT cognition

d. Dependent Variable: software quality

ANOVA^d

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|-----|-------------|--------|-------------------|
| 1 | Regression | 69.213 | 1 | 69.213 | 88.267 | .000 ^a |
| | Residual | 231.316 | 295 | .784 | | |
| | Total | 300.529 | 296 | | | |
| 2 | Regression | 110.047 | 2 | 55.023 | 84.926 | .000 ^b |
| | Residual | 190.482 | 294 | .648 | | |
| | Total | 300.529 | 296 | | | |
| 3 | Regression | 117.408 | 3 | 39.136 | 62.619 | .000 ^c |
| | Residual | 183.121 | 293 | .625 | | |
| | Total | 300.529 | 296 | | | |

a. Predictors: (Constant), ICT environments

b. Predictors: (Constant), ICT environments, Institutional properties

c. Predictors: (Constant), ICT environments, Institutional properties, ICT cognition

d. Dependent Variable: software quality

Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|--------------------------|-----------------------------|------------|---------------------------|--------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -6.196E-03 | .051 | | -.121 | .904 |
| | ICT environments | .480 | .051 | .480 | 9.395 | .000 |
| 2 | (Constant) | -3.025E-03 | .047 | | -.065 | .948 |
| | ICT environments | .475 | .046 | .474 | 10.213 | .000 |
| | Institutional properties | .371 | .047 | .369 | 7.939 | .000 |
| 3 | (Constant) | -2.631E-03 | .046 | | -.057 | .954 |
| | ICT environments | .478 | .046 | .477 | 10.466 | .000 |
| | Institutional properties | .371 | .046 | .369 | 8.097 | .000 |
| | ICT cognition | .159 | .046 | .157 | 3.432 | .001 |

a. Dependent Variable: software quality

Excluded Variables^c

| Model | | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|-------|--------------------------|-------------------|-------|------|---------------------|-------------------------|
| | | | | | | Tolerance |
| 1 | ICT cognition | .155 ^a | 3.079 | .002 | .177 | 1.000 |
| | Institutional properties | .369 ^a | 7.939 | .000 | .420 | 1.000 |
| 2 | ICT cognition | .157 ^b | 3.432 | .001 | .197 | 1.000 |

a. Predictors in the Model: (Constant), ICT environments

b. Predictors in the Model: (Constant), ICT environments, Institutional properties

c. Dependent Variable: software quality

Casewise Diagnostics^a

| Case Number | Std. Residual | software quality |
|-------------|---------------|------------------|
| 37 | -3.031 | -1.95786 |
| 55 | -3.326 | -2.95831 |
| 59 | -3.705 | -2.96093 |

a. Dependent Variable: software quality

Residuals Statistics^a

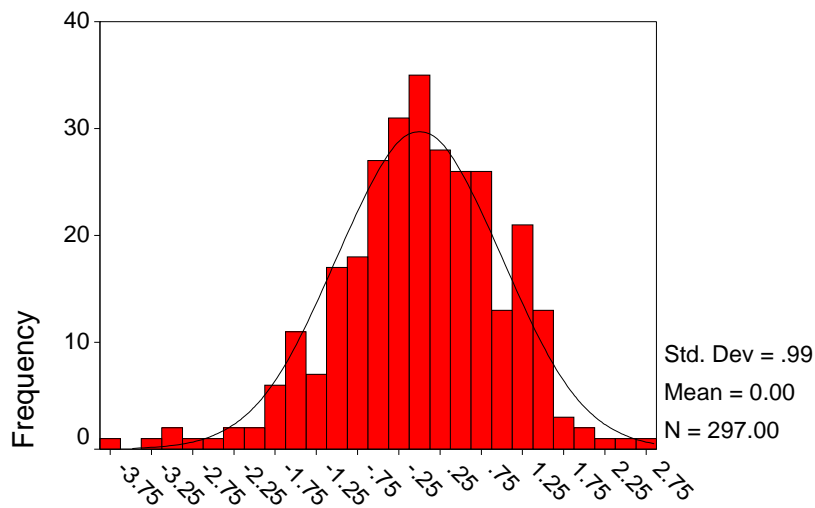
| | Minimum | Maximum | Mean | Std. Deviation | N |
|----------------------|------------|-----------|-----------|----------------|-----|
| Predicted Value | -2.0327811 | 1.4815291 | -7.07E-03 | .6298003 | 297 |
| Residual | -2.9292035 | 2.1536443 | -1.94E-17 | .7865445 | 297 |
| Std. Predicted Value | -3.216 | 2.364 | .000 | 1.000 | 297 |
| Std. Residual | -3.705 | 2.724 | .000 | .995 | 297 |

a. Dependent Variable: software quality

Charts

Histogram

Dependent Variable: software quality



Regression Standardized Residual

