Investigating the Strategic Relationship between Information Quality and e-Government Benefits

Thesis submitted for the degree of Doctor of Philosophy by

Hussain Alenezi

Department of Information Systems and Computing

Brunel University

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“My Lord! Increase me in knowledge”

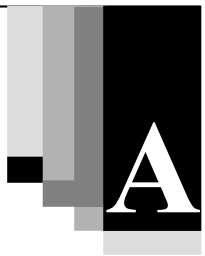
From Quran, Surra Tahah: Aayah 114

PhD Summary

This thesis focuses on investigating the relationship between improvements in information quality and the benefits and performance of e-Government organisations. As information quality is a multidimensional measure, it is very crucial to determine what aspects of it are critical to organisations to help them to devise effective information quality improvement strategies. These strategies are potentially capable of changing government organisational structures and business processes. To develop effective information quality improvement strategies, it is important to explore the relationships between information quality ('cause') and organisational benefits and performance ('effect'). The limited research on information quality and organisations performance focuses on private sectors and pays little attention to governments and public organisations. To the best of the author's knowledge, there is no single study which covers the relationships between information quality and organisations performance in Kuwait. E-Government success literature has rarely investigated information quality as a contributor to the success of e-Government initiatives.

This thesis makes a step forward and contributes to the body of knowledge by examining the nature, direction and strength of the connections between information quality and the success of e-Government initiatives as it proposes and discusses a conceptual model (Figure 3.6) and contextual framework by means of which organisations performance and information quality research can be viewed. This thesis adopts a hypothetic-deductive and inductive approach with mixed methods, to conduct the present study. Quantitative and qualitative methods were then utilised to empirically validate the conceptual framework.

The author claims that the relationships between information quality and strategic benefits along with institutional value were in upright agreement. Similarly, both qualitative and quantitative analyses highlighted that improvement in different aspects of information quality can lead to a better organisational image. Usability and usefulness attributes of information quality came on the top of the key influencers on both strategic benefits and institutional value. Furthermore, analyses highlighted some differences among information sharing participants' views regarding the relationship between constructs investigated in this research. Figure 6.5 presents a revised research model including the new constructs, such as, cost savings, improved decision-making, and increased citizen satisfaction, which have been found to be affected by information quality and affect organisational performance.



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Dedication

This thesis is dedicated to my late brother Abdul Mohsen who raised me and my brothers and sisters like a father.
God bless his soul.

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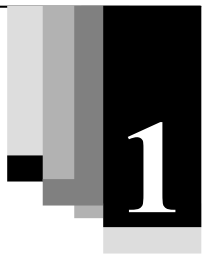

Chapter 1: The Research Context

1.1 Overview

E-Government services aim to improve the quality and assurance of government services, increase the efficiency of administrative processes and facilitate effective participation and engagement with service users (Gronlundand Horan, 2004; Helbig *et al.,* 2009). Although e-Government has the potential to improve governments' performance and enhance the quality of service delivery, there are still many challenges that impede the development of e-Government initiatives. Advocates of e-Government report that poor information quality has a negative impact on government organisations and the government itself (Shim and Eom, 2008). For example, when ease of navigation, information dissemination, online support and service delivery are well designed and executed, the service quality is high and a favourable e-Government experience developed which results in increasing loyalty from the citizens to the institution of government (Affisco *et al.,* 2006).

The normative literature well investigates and analyses the significance of e-Government and information in government organisations (e.g., Jaeger, 2003; Gilbert and Littleboy, 2004; Shim and Eom, 2008). Nevertheless, there is limited research conducted on Information Quality (IQ) in the context of government organisations. Furthermore, e-Government success literature has rarely investigated information quality as a contributor to the success of e-Government initiatives (Jaklic, 2011). In addition, the linkage between IQ and e-Government strategic benefits and institutional value has been minimally examined to date, with relatively little theoretical grounding (Jaklic, 2011). This chapter aims to highlight the research issues identified from the literature with Section 1.1 discussing the need for this research to improve IQ in e-Government, and presenting several challenges that exist in e-Government. Thereafter, Section 1.2 illustrates IQ improvement and its importance in e-Government. The aim and objectives of this research are defined, with an outline of the thesis presented sections 1.3 and 1.4 respectively.

1.2 Background to the Research Problem

Improvement in information quality can inevitably lead to productivity improvements which lead to improved competitive position (Golder *et al.,* 2012). Poor information quality dispels efforts and production capacity and causes reworking, each of which can impede productivity, incur extra cost and may damage the image and reputation of an organisation. Poor information quality also impacts government organisations in other many levels (Redman, 1998). For example, at the operational level, poor data leads directly to customer dissatisfaction, increased cost, and lowered employee job satisfaction. At the tactical level, for example, poor information quality compromises decision-making. The lack of relevant, complete, accurate, and timely information may be the single biggest hindrance to developing sound e-Government strategy. Moreover, decision makers in government organisations have to decide to which improvement initiatives should be considered and which strategy should be followed, and what benefits will be gained from such improvements (Schwester, 2011).

As Information Quality is a multidimensional measure, it is very crucial to determine what aspects of it are critical to organisations to help them to devise effective information quality improvement strategies. These strategies are potentially capable of changing government organisational structures and business processes. These strategies, if implemented correctly, can produce substantial organisational, technical, and business benefits in addition to enable organisations to better coordinate their efforts and improve their performance (Kraemer and King, 2003). In order to develop effective information quality improvement strategies, it is important to explore the relationships between information quality (‘cause’) and organisational benefits and performance (‘effect’).

E-Government services increasingly centre on the needs of both citizens and businesses. At the same time, government leaders and e-Government proponents seek streamlined and efficient internal transactions and services (Scholl, 2005). This requires the interoperation and collaboration of government agencies and their respective Electronic Government Information Systems (EGIS) across different levels and departments. The core issue of e-Government integration and interoperation is information sharing (Scholl and Klischewski, 2007). Yet information can be shared on fairly different levels of quality and in many different ways, requiring different degrees of integration (Gil-Garcia *et al.,* 2007). Furthermore, government organisations who engage in information sharing projects tend to have multiple views on the required quality of information exchanged. Information sharing participants perceptions of information quality vary, and dependant on their role (information providers, users, and managers) (Scholl, 2007). Different perceptions of these participants

need to be understood in order to enable organisations to better manage their resources and operation.

The perceived value of information is determined by the information receiver's accumulated experience with the information itself and the information sharing process (Marchand, 1990). The lack of perceived value of information in information sharing environment (Pardo et al. 2008), can negatively influence the extent of information stewardship and information use, and become a major obstacle for government organisations. Thus, all the aforementioned problems illustrate that there is a need for government organisations to improve information quality to attain benefits such as (a) enabling quick reaction to users' needs, (b) creating closer relationships between organisations, (c) enabling development of human resources, (d) enabling greater credibility in institutions and (e) providing constant control of actions. To achieve these benefits, further research on the relationships between information quality and organisational performance is essential to develop a comprehensive understanding of these relationships and this study represents a step in that direction.

1.3 Significance of Information Quality in e-Government Context

This research investigates information quality improvement strategies that enable government organisations to realise the benefits from e-Government initiatives and projects. These strategies may have an impact on the fundamental components of modernising the public sector through (a) identifying and developing organisation information sharing structure, (b) interacting in various ways with citizens and businesses, and (c) reducing the cost and layers of organisational business processes (Cabinet Office, 2000). Governments provide a wide variety of information to citizens, businesses and employees through IS and the Internet. In this context, e-Government can develop strategic connections between public sector organisations and their departments and enable e-Government levels, e.g. central, city, and local, to communicate with one another. These connections and degree of communication improves information sharing. In response, the latter improves the cooperation between government entities by making it easier (a) to create and implement government strategies, transactions and policies, and (b) to better use and run government processes, information and resources (Heeks, 2001).

As Helbig *et al.,* (2009) pointed out, the goals of e-Government are to improve the quality of the service, increase the efficiency of administrative processes and enable governments to more effectively participate and engage with service users. Hence, the attainment of e-Government goals is of strategic importance for governments. The anticipated benefits from

information quality improvement strategies, such as better services, operational savings and increased program effectiveness, can be gained from these information-sharing initiatives (Zheng *et al.,* 2009). While information sharing is important, the significance of its impact on the performance of government organisations depends on the type of information shared, when and how it is shared, and with whom (Holmberg, 2000). Garcia and Pardo (2005) outlined requirements to enable government organisations ensure high quality and homogenous information by creating (a) an overall plan to manage information, (b) an information quality assurance program, (c) agreements with partners by information sharing standards and common data definitions, (d) getting continuous user feedback, and (e) training (Brown, 2000; Burbridge, 2002).

Papadomichelaki *et al.,* (2006) emphasizes the importance of quality in e-Government. They provide a more detailed view of the importance of quality and highlight that quality stems from the back office and is based on those internal quality practices which impact on the front-office. The citizens' interaction is with the front-office and therefore government institutions have to ensure that their entire structure and operations is quality based. Improvements in information quality positively affect organisation's business process and performance (UN, 2008). In addition, quality information enables different stakeholders to access government services 24 hours a day, 7 days a week (Albusaidy and Weerakkody, 2008). Moreover, quality information reduces government expenditures by providing cheap and reliable communication channels between governments' agencies and citizens (Aydinil *et al.,* 2007). Furthermore, quality information empowers organisations to provide more transparent and efficient accessible services to citizens (Al-Khouri and Bal, 2007).

Nevertheless, researchers such as Scott *et al.,* (2011) suggest that little research has been conducted into identifying which measures determine e-Government success whilst enhancing the capacity to share information between organisations. The previous discussion motivated the author to undertake this study and to identifying the key information quality attributes which contribute to organisation success. The next sections will discuss the research aim and objectives in addition to a thesis outline to present the documentation structure.

1.4 Research Aim and Objectives

The research reported in this thesis is based on the underlying principle that sharing high quality information offer organisations a greater capacity to share information across organisational boundaries, to discover patterns and interactions, and to make better-informed

decisions based on more complete data (Pardo et al., 2008). The specific benefits of sharing high quality information include increased productivity, improved decision making, reduced costs, increased revenues, and integrated services (Gil- García and Pardo, 2005). In addition, the changing and expanding use of data in government organisations demands increased attention to all the components of information quality, i.e. accuracy, timeliness, consistency, and completeness Knight & Burn. (2005). Until recently, this attention was confined to improving the quality of information and data generated and used within single organisations. Today, the effectiveness of government organisations often depends on data exchanges with other organisations. As more organisations deploy and use communication networks in their day-to-day processes, sharing data across institutions becomes more attractive and more feasible (Naumann *et al.,* 1999).

Thus, the aim of this thesis is to:

> "*The development of a model for the improvement of information quality in information sharing initiatives impacting e-Government benefits*."

The objectives of this PhD thesis are outlined as below,

- ***Objective 1:*** To identify the information quality factors affecting e-Government benefits in information sharing initiatives.

- ***Objective 2:*** To identify the information quality factors and e-Government benefits affecting e-Government performance.

- ***Objective 3:*** To develop a conceptual model to identify the salient information quality factors impacting e-Government benefits and performance.

- ***Objective 4:*** To test the model in government organisations in Kuwait, and provide a novel contribution to the domain of e-Government and information quality.

- ***Objective 5:*** To propose a conceptual model to assist in studying the effects of information quality improvement on e-Government benefits and performance.

1.5 Thesis Outline

The structure of this PhD thesis follows the methodology described by Phillips and Pugh (1994) and consists of four elements namely: (a) background theory; (b) focal theory; (c) data theory and (d) novel contribution. Background theory focuses on discussing the research area (see Chapter One), assessing the field of research and identifying the problem domain (see Chapter Two). The second element of the thesis (focal theory) deals with generating a conceptual model. This is explained and discussed in Chapter Three. Data theory addresses issues such as: (a) the most appropriate epistemological stance to adopt; (b) the development of a suitable research methodology and, (c) the conditions affecting the choice of research strategy. These issues are discussed in Chapter Four of this thesis. In addition, data theory deals with the data collection process and analysis, which is reported in Chapter Five. The fourth element (novel contribution) is concerned with aligning the importance of the thesis, to the development of the discipline being researched (see Chapters Six). In Chapter Seven, the researcher has summarised the research presented in this thesis with a brief outline of contributions and discusses the potential areas for further research. This thesis is composed of seven chapters, each providing an understanding to various issues viewed to be critical for this research. The thesis outline is illustrated in Figure 1.1 and is explained in the following paragraphs.

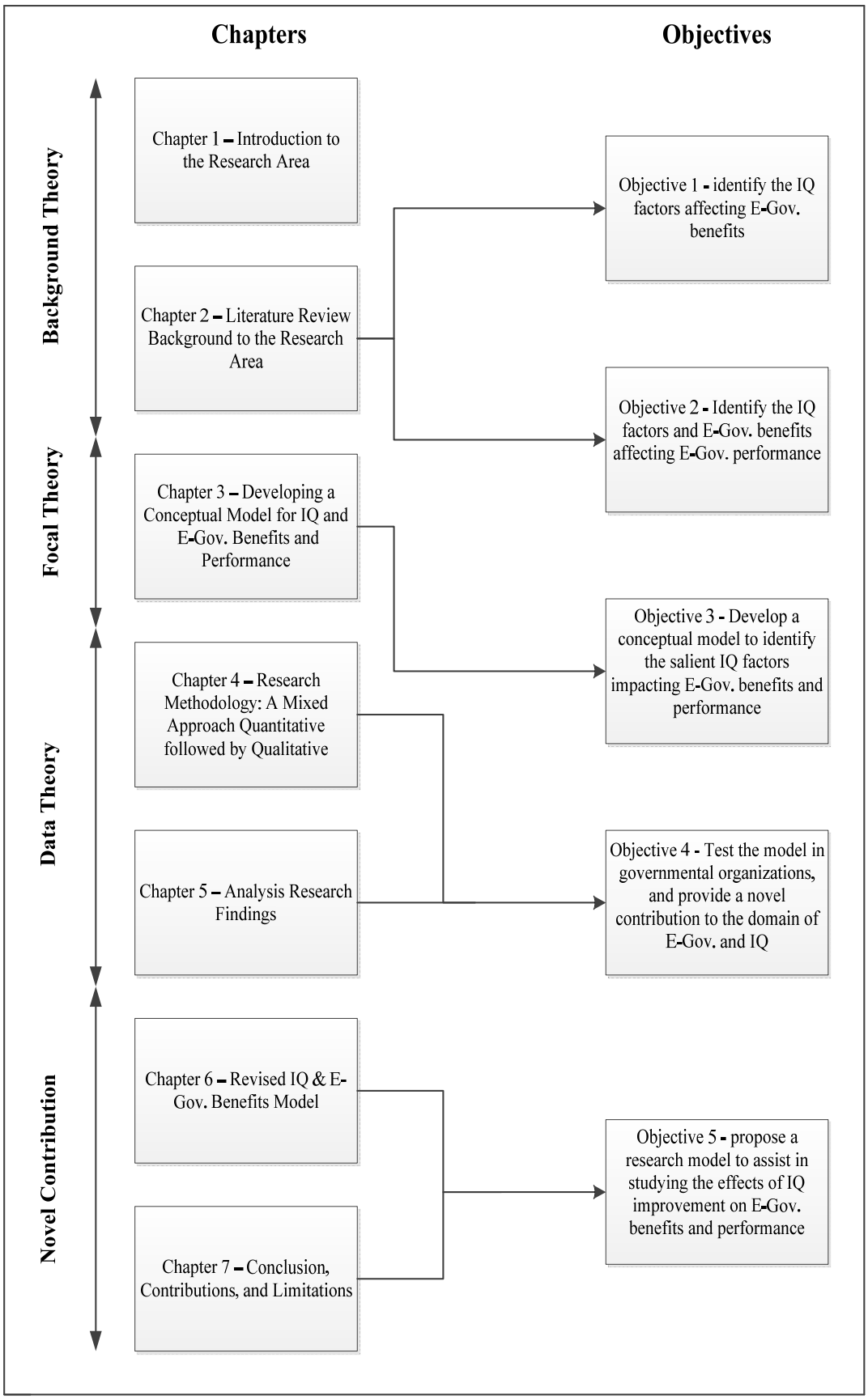

Figure 1. 1: Thesis Outline

- **Chapter 1: The Research Context**

  Chapter 1 begins by providing an introduction to the main issues this research will address by focusing on Information Quality in e-Government. The issues under research focus is the need to improve information quality while information sharing within government organisations. Thereafter, objectives are stated with an outline of the thesis (Figure 1.1).

- **Chapter 2: Literature Review**

  Having provided a brief introduction to the research area and established the scope, the thesis begins to review the literature on information quality and e-Government. Initially, this chapter critically reviews information quality literature with focus on information quality management, and measurements. Then the chapter moves to review literature on e-Government and information sharing within government organisations, to examine the roles of information sharing participants. Furthermore, this chapter reviews literature on the role of information quality management in governmental organisations and the strategic benefits and the institutional value gained from the improvements in information quality.

- **Chapter 3: Developing a Conceptual Model**

  Chapter 3 proposes a conceptual model for information quality improvements and the strategic benefits & institutional value within e-Government (Figure 3.6). The proposed model can be used as a decision-making tool and thus, support management when taking decisions regarding information quality improvements. Additionally, the model can be used by practitioners and researchers to analyse and understand the relationship between information quality and e-Government benefit. In addition, this chapter investigates the role of information sharing participants in e-Government projects.

- **Chapter 4: Research Methodology**

  Chapter 2 is setting the background of this research and Chapter 3 proposes a conceptual model for the strategic relationship between information quality and e-Government benefits. These chapters have helped the author to understand and identify research issues for further investigation. To undertake the research that focuses on these issues, a research methodology is followed to test the proposed conceptual model in the practical

arena. The reasoning behind the selection of mixed research methodology is stated in Chapter 4. The inherent problems within the various research philosophies are stated and the suitability to this research is provided.

- **Chapter 5: Data Analysis and Hypothesis Testing**

  Having achieved an understanding of all the relevant issues for this research, the thesis then provides a description of the data collected from surveys and interviews performed in government organisations. Chapter 5 provides a background to these organisations and the issues related to information quality improvements and strategic benefits, along with the institutional value.

- **Chapter 6: Discussion**

  Based on the survey results, interviews and research findings in the previous chapter, this chapter briefly outlines the current research, illustrates the lessons learnt from the empirical research, and revises the conceptual model which identifies the strategic benefits and institutional values related to certain information quality improvement performed in government organisations.

- **Chapter 7: Conclusions, Contribution, Limitations and Future Research**

  Chapter 7 summarises the research presented in this thesis. Based on the research presented in this thesis, the author describes the aim and objectives the theses met and main findings from the overall theses. Thereafter, the statement of the contributions and research novel is presented. To conclude the chapter and this thesis, the researcher provides the major conclusions regarding the possible limitations of the research and describes the potential areas of further research.

This research is conducted in five phases: (1) Exploratory phase; (2) pilot phase; (3) testing phase (A); (4) testing phase (B); and (5) evaluation phase. The exploratory phase covers the processes of literature review which aims to identify research gaps and to set research goals. This phase leads to the creation of the proposed model. Before starting the pilot phase, the author conducts several interviews in order to generate feedback on the proposed model and to help developing the questionnaire items. The pilot phase encompasses conducting a miniature version of the actual study to check and refine the questionnaire which will be used to collect data. After collecting the data through the pilot study, the questionnaire is refined

and the data is collected again at full scale. In testing phase (A), the questionnaire data are analysed quantitatively by statistical tests. The results of these tests are further investigated by conducting a qualitative study in Testing phase (B). Then, the qualitative and quantitative results are synthesised and discussed and forwarded to the last phase, the evaluation phase. In this phase, a revised version of the research model is presented. The revised model includes new factors emerged through all the research phases. To summarise and to guide the reader through the thesis, the graphical research methods in Figure 1.2 is presented to illustrate graphically the research processes that were followed in this study to produce this thesis.

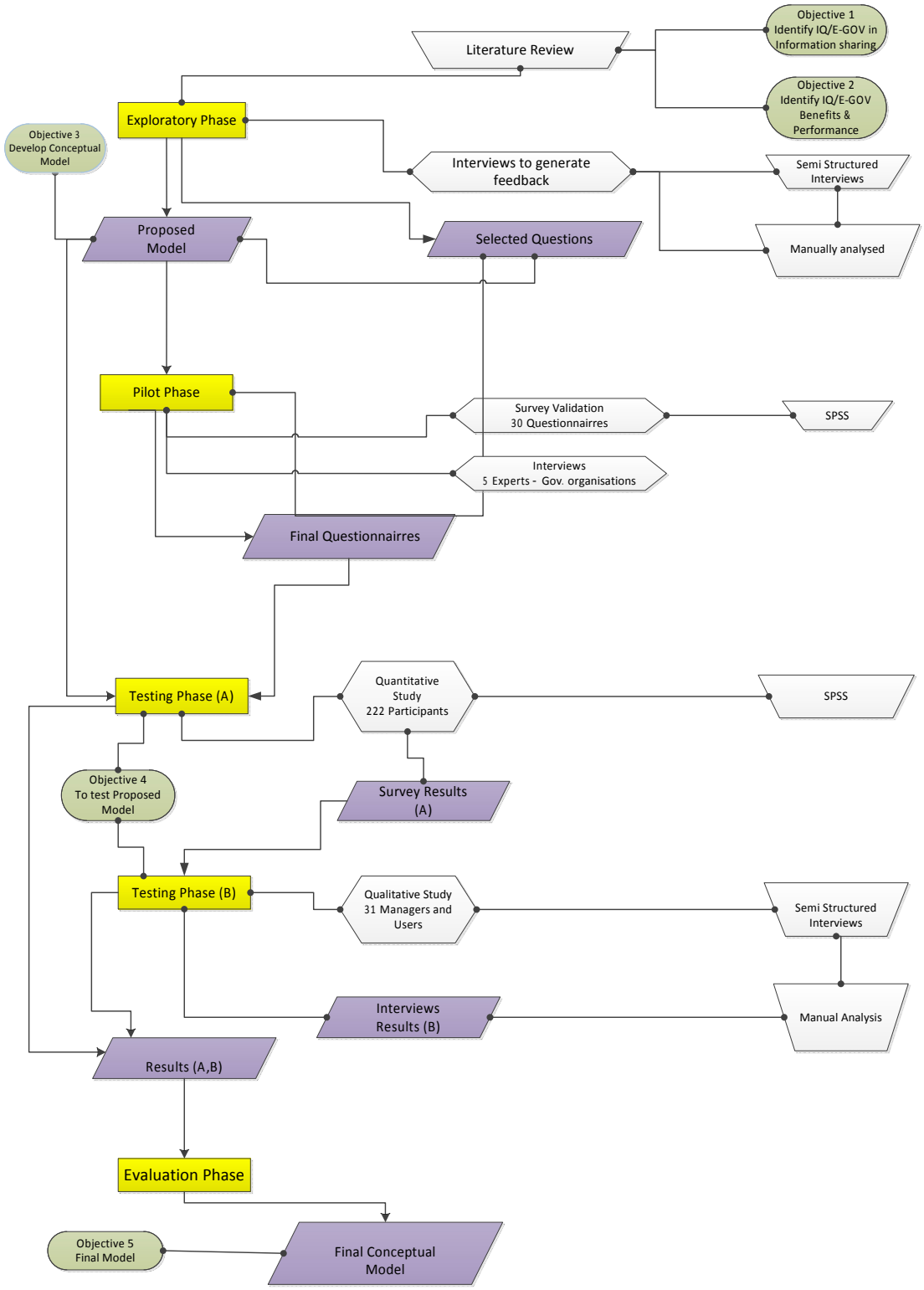

Figure 1. 2: Thesis Graphical Research Method

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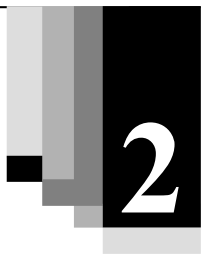


Chapter 2: Literature Review

2.1 Introduction

E-Government services progressively revolve around the needs of both population and businesses. As a result, leaders of any government as well as advocates of e-Government constantly provide transactions and services to accomplish strategic benefits (Redman, 1995; 1996; Scholl, 2005). Such benefits depend upon quality of information and systems, two important reasons for successful e-Government websites (Wangpipatwong *et al.,* 2005). That necessitates a comprehensive restructuring the departments of the government and all processes of collaboration and interoperation of governmental agencies. This has rendered sharing information by computers an essential issue for e-Government integration (Gil-Garcia *et al.,* 2007).

High quality information is highly beneficial to citizens and to government bodies (Gil-Garcia et al., 2007). Information is shared and used on different ranks of quality and in a variety of ways, which requires different levels of integration and interoperation. Practitioners a long with Academics maintain that research ought to be dedicated explicitly to Information Quality (IQ) which principally contributes to the success of e-Government initiative. Therefore, this research focusses on information quality, the impacts it has on e-Government benefits strategically and institutionally, and its ensuing effects on performance.

This chapter reviews the literature on Information Quality and the positive e-Government outcomes. In this context, there are three aspects connected to research on information quality: 1) information quality assessment, 2) the quality of the contextual information, and information quality management (Ge and Helfert, 2007). Information systems and organisational factors, it is shown in the literature reviewed, are two primary sources of information quality. The chapter then offers the major outcomes and concepts from the reviewed literature to examine the contribution of information systems and information quality, the aim being to clarify the role and the contributions of organisational factors to information quality.

Section 2.2 explores the theoretical roots of information quality, current related definitions, diverse dimensions, techniques of measurement, management approaches and contributing success factors. Section 2.3 discusses information sharing roles in e-Government initiatives success of. It also examines the connection between information quality, information sharing, and e-Government benefits and value.

2.2 Information Quality

The researcher embarks by examining the theoretical roots from which information quality evolves. Afterwards, the researcher discusses the predominant literature to determine a meticulous definition of information quality, its dimensions, its management and measurement techniques.

2.2.1 Theoretical Background of Information Quality

This section theoretically approaches the roots of the concept. Roots of information quality, to be discussed below, originate from a range of disciplines including information systems, quality, strategy, and economics.

Liu (2000) recognised some theoretical and practical applications of semiotics such as computer science, anthropology, education, information systems and organisational theory. This research benefits a lot from applying semiotics to the development of information systems. Most remarkably, when organisations are viewed semiotically, they can be thought of as information systems. Likewise, information systems nested layers can describe the organisation. The informal information system constitutes the outer layer, “a sub-culture where meanings are established, intentions are understood, beliefs are formed and commitments with responsibilities are made, altered and discharged” (Liu, 2000). The second layer represents the formal information systems. Formal information systems consist of red tape, serving to replace intention and meaning with codified systems. The core layer is the technical information systems. In this layer, these technical information systems automate parts of the formal systems. Combined, these three layers constitute what Liu refers to as the “organisational onion”, shown in the figure below.

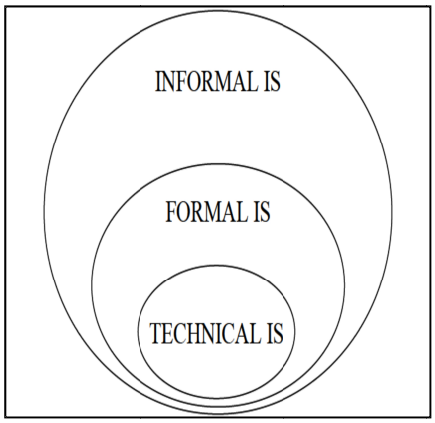


Figure 2. 1: Organisational Onion (Source: Liu, 2000)

Academics and practitioners defined quality in various ways. One of the earliest advocates of quality as a managerial concept was W. Edwards Deming. W. Edwards is best known for his intense positive involvement in reconstructing Japan industrially after the Second World War. Hence, to appreciate Deming's considerable effort, the Deming Prize established in 1951 to distinguished businesses, which attained a high level of quality. According to Deming (1982), quality improvements inevitably lead to improve productivity, hence enhancements in competitiveness. Low quality, on the other hand, squanders production capacity leading to reworking. Low quality, furthermore, decreases productivity, increases cost and tarnishes reputation and credibility. Deming also highlighted that "the customer is the most important part of the production line". He particularly noted, "the cost to replace a defective item on the assembly line is fairly easy to estimate, but the cost of a defective unit that goes out to a customer defies measure". Ironically, "the most intriguing feature of the criteria for the Deming Prize is that there is no mention of customer satisfaction" which shapes the image of the organization (Mahoney and Thor, 1994).

A second significant contribution to quality literature is that of Juran (1988). Juran gave customers an essential role in defining and measuring information quality. Juan proposes a rather basic definition to quality which is "fitness for use, and he added that the, definition must quickly be enlarged, because there are many uses and users". Juran (1988) significantly extended the customers definition "to include all persons who are impacted by our processes and our products". For Juan, a customer is basically everyone involved in processing or handling products until they reach the end user. Costs of low quality and loss of sales are, in Juran's viewpoint, the reasons why organisations must work hard to achieve quality.

Another important contributor to the information quality literature is Crosbys' works (1992, 1996). Crosby (1992) stressed customer's role, "the only absolutely essential management characteristic of the twenty-first century will be to acquire the ability to run an organisation that deliberately gives its customers exactly what they have been led to expect and does it with pleasant efficiency". For this mission to be fulfilled, Crosby believes an organisation must do its best to make all its key constituents, mainly the employees, customers and suppliers, successful. Crosby (1996), however, warns that "quality is hard to pin down, because each person thinks everyone else defines it the same way he or she does". Another major contributor to the quality is the International Standardisation Organisation (ISO) 9000 series. These standards are oriented towards organisational capabilities in the contexts of quality management. ISO 9000 certification may be voluntarily pursued by organisations to assure their international and local customers they have achieved high level of quality in their products, services and customer support (Mahoney and Thor, 1994). Providing the previous background, the researcher concludes that definitions of quality come from different viewpoints, depending on the contextual nature each definition stems from.

2.2.2 Defining Information Quality

Researchers and practitioner stressed the need for a clear and accurate definition of information quality (Wang and Strong, 1996; Ottos *et al.,* 2009). This section explores some of the attempts in the literature to define information quality. Additionally, different dimensions of information quality that are recognised by different models are explored and discussed. A growing awareness about the necessity of information quality emerged increasingly with the advent of computing and computers. In 1958, Maffei wrote, "a theory of the cost and value of information is needed. We need to know quantitatively what price is being paid by deviating from a 'best' course of action and weigh this against the cost of getting better information". Maffei was referring to cost in every sense of the word, including the cost of taking unwise decisions due to inferior information and opportunity cost. Likewise, Trueblood (1960) dedicated his attention on what was at the time the freshly emerging realm of operations research. Trueblood, succinctly summarised his philosophy saying, "the purpose of operations research is not to replace management judgment but to provide more and better information."

2.2.3 Information Quality Dimensions

There are usually certain discrepancies that exist in most data quality dimensions because of the contextual nature of quality. Jarke *et al.,* (1995); Wang and Strong (1996); Naumann (2002); Bovee *et al.,* (2004) and Redman (2005) provide the six most significant catoefori3s of quality dimensions.. Catarci and Scannapieco (2002) defined the most common dimensions of data quality: completeness, accuracy, timeliness and consistency. However, Batini (2009) believes that there is no common consent as to which group of dimensions describes quality. Below is a brief discussion of Accuracy, Completeness, Consistency and Time related dimensions as outlined by Catarci and Scannapieco (2002).

- **Accuracy**: Several definitions are provided for the term accuracy. Wang and Strong (1996) define accuracy in terms of the extent to which data are seen to be correct, reliable and certified. Michnik, J., & Lo, M.C.(2009) specify that data are accurate when the data values stored in the database correspond to real-world values. According to Redman (2005), accuracy is defined as "a measure of the proximity of a data value, 'v', to some other value, 'v', which is considered correct". In general, two types of accuracy can be distinguished, syntactic and semantic. Information quality methodologies consider only syntactic accuracy and define it as the closeness of a value, 'v', to the elements of the corresponding definition domain 'D'.

- **Completeness**: Completeness is defined as the "degree to which a given data collection includes all the data describing the corresponding set of real-world objects". Comparing several definitions of completeness reveals that there is a substantial agreement on the abstract definition of completeness. Definitions differ as to the context to which they refer; for example, Wand and Wang (1996) refer to the information system; Jarke *et al.,* (1995) report of the data warehouse and Bovee *et al.,* (2001) denotes completeness as the sense of an entity. In the research area of relational databases, completeness is often related to the meaning of null values. A null value has the general meaning of a missing value; a value which exists in the object described but is not available in the data on it. In order to characterise completeness, one should understand why the value is missing. A value can be missing either because it exists, but is not known, because it does not exist at all, or because it is not known whether it exists (Atzeni and Antonellis, 1993).

- **Consistency**. The consistency dimension refers to the violation of semantic rules defined over a set of data items. With reference to the relational theory, integrity constraints are a type of such semantic rules. In the statistical field, data edits are typical of the semantic rules allowing for consistency checks (Batini, 2009). In information systems, consistency is regarded as the extent to which information is presented in the same format and compatible with previous data (Kahn *et al.*, 2002). Consistency is also regarded to be part of representation quality category as it concerns itself with how the information is presented to meet the need of the user (Dedeke, 2005).

- **Time-related Dimensions**: A vital aspect of data is of being updated over time. The main time-related dimensions proposed in the literature are currency, volatility and timeliness. Wand and Wang (1996) and Redman (2005) provide very similar definitions for timeliness and currency. Liu and Chi (2002) assume the same meaning for timeliness, while Bovee *et al.*, (2001) provide a definition for timeliness in terms of currency and volatility. The definition of currency expressed in Bovee *et al.*, (2001) corresponds to timeliness as defined by Liu and Chi, (2002). This comparison shows that there is no agreement on the abstract definition of time-related dimensions; typically, currency and timeliness are often used to refer to the same concept.

Wang *et al.,* (2005), who adopted a customer perspective similar to Juran's (1988), noted that information quality has value that is transferred to customers, internally and externally. Consequently, this perspective has become a driving force for Wang and Strong (1996) to propose a customer-oriented model for the key information quality aspects. They stated that "although firms are improving data quality with practical approaches and tools, their improvement efforts tend to focus narrowly on accuracy". They reported on the results of a key study . Wang and Strong began with a a board base set of roughly 200 data quality aspects. Then, they applied factor analysis to reduce the items down to solely 20 dimensions. In the second stage, the set was reduced to 15 dimensions and four categories to group these dimensions: intrinsic, contextual, and representational and access:

- Intrinsic Data Quality (DQ) denotes that data have quality in their own right.

- Contextual DQ highlights the requirement that data must be considered within the context of the task in hand.

- Representational DQ and Accessibility DQ emphasize the role of systems.

These findings are consistent with the understanding that high-quality data should be intrinsically good, contextually appropriate for the task, clearly represented and accessible to the data consumer. Table 2.1 depicts Wang and Strong's model of data quality as a multi-dimensional construct. Although the exact number of dimensions considered and the arrangement of the dimensions varies somewhat from researcher to researcher, the essence of this model now has broad support within the relevant research community.

IQ Category	IQ Dimension
Intrinsic	Accuracy, Objectivity, Believability, Reputation
Representational	Interpretability, Ease of Understanding, Concise Representation, Consistent Representation
Contextual	Relevancy, Value-added, Timeliness, Completeness, Amount of Information
Accessibility	Accessibility, Access Security

Table 2. 1: Data Quality as a Multidimensional Construct (Source: Wang and Strong, 1996)

Strong *et al.,* (1997) used this model to aid their research into information quality problems and their solutions in three organisations. Among their findings were that certain patterns of data quality problems cross from one hierarchical grouping to another. For instance, a believability problem with a particular database can lead to perceptions of low added value, thus crossing from intrinsic to contextual. Similarly, problems with inconsistent data representation can be perceived as accessibility problems, this shows that some IQ dimensions are in the borderline between two IQ categories, having a consensus in the assignment of dimensions to quadrants may depend on context (Kahn *et al.,* 2002). In general, Strong *et al.,* (1997) found two different approaches to solving problems: changing the systems or changing the production process. As a result of these findings, the researchers strongly advocated that the view of information quality problems should be expanded, along with the approach to solving these problems, beyond the limited perspective of the intrinsic quality dimensions.

2.2.4 Information Quality Management

Information quality is as a sufficiently distinct discipline which means it has a distinctive approach to management. The author provides comprehensive insights into measuring information quality approaches, both subjective and objective. In addition to that, major information quality management approaches, such as - (TDQM) - Total Data Quality-

Management, benchmarking and data production maps are discussed. Researchers have derived approaches and frameworks of managing information quality from a comparison drawn between manufacturing products and manufacturing information services (Wang *et al.,* 1995; Wang and Strong, 1996; Wang *et al.,* 1998; Ballou *et al.,* 1998; Shankaranarayanan *et al.,* 2000; Scannapieco *et al.,* 2005).

There are a number of differences between managing physical products quality of and managing services products quality. That renders the former approaches insufficient to apply on the latter (Deming, 1982; Mahoney and Thor, 1994; Crosby 1996 and Juran, 1988). In this context, Shankaranarayanan *et al.* 2000 state that a faithful representation must be accurate to detail what data captured and how, where and by whom it was done. But this analogy is not satisfactory enough because tools do not get incorporated into end products.

Compared to collecting and storing physical manufacturing, the collection and storage of raw information cost very little. The sort of quality between services and products is also different because information quality dimensions lack a physical counterpart. For example, dimensions such as believability basically have no counterpart in manufacturing product. Although termed as an intrinsic dimension, the accuracy dimension cannot be measured intrinsically, but rather extrinsically (Redman, 1995; Wand and Wang, 1996). Redman further stated that information quality is different from physical quality since useful information is either novel or unique, which in its turn makes the values interesting. .Pierce (2005) proposed using feedback from customers, staff or even management to handle this uniqueness of the values and at the same time raise or maintain quality.

2.2.5 Information Quality Measurement

Proper information quality management requires proper measuring of information quality (Stvilia *et al.,* 2007). Ballou and Pazer (1985), who proposed an error evaluation model, identified four relevant dimensions: accuracy, completeness, consistency and timeliness. Together they proposed measurements for the four dimensions. On the contrary, Agmon and Ahituv (1987) used the theory of quality control and divided data reliability up into: internal reliability (accepted data use), relative reliability (measured against user requirements), and absolute reliability that is measured against observation and experience (Zeist and Hendricks, 1996).

Several researchers focused on accuracy and considered other dimensions to be less significant. Meanwhile, Paradice and Fuerst (1991) proposed a formula to compute the ratio of stored error. Paradice and Fuerst's limited research focus was highly beneficial to data quality management as it bridged the gap in the scarcity of research conducted on information processing using methods of quality control of manufacturing. Further, Paradice and Fuerst emphasised that data is the raw material that can be reused once and again.

- **Subjective Measurements:** Lee *et al.,* (2002) observed that despite a decade of research and practice, only piece-meal, ad hoc techniques were yet available for measuring, analysing and improving IQ in organisations. In response to this situation they developed a measurement instrument, known as the Information Quality Assessment (IQA), which measured stakeholder perceptions of each dimension in the model by Wang and Strong (1996). This instrument, which employs 69 items to measure the various dimensions of information quality, has been used as the basis of several studies requiring information quality measurement (Kahn *et al.,* 2002; Pipino *et al.,* 2002) and also for studies which further extend this measurement concept, such as the PSP/IQ model (Kahn *et al.,* 2002). The PSP/IQ model aggregates the results of the 69 items and 16 dimensions measured by the IQA to produce a measure of information quality consisting of only four numbers. By using the IQA to measure the dimensions, the quadrant measurements are derived by calculating the mean scores for the dimensions associated with each quadrant (Kahn *et al.,* 2002; Lee *et al.,* 2002). Chapter three outlines a framework using the PSP/IQ model and its four quadrants to assess the strategic benefits from e-Government initiatives recognised from the use of information systems taking account of the dimensions of information quality.

- **Objective Measurements:** Despite the quantitative nature of the measurements in the previous section, these measurements are subjective, based on human perceptions and subject to the notions of human interpretation of the state of information quality and the meaning of the questions asked. Herein the focus shifts to objective measurements, beginning with a look at formal definitions, followed by an introduction to the difficulties associated with measuring information quality objectively and proceeding to a discussion of proposed metrics and measurement scales.

Wand and Wang (1996) believed that Information System represents the real-world/an application system as the customer sees it. That's why they defined (IS) as an accurate demonstration of a system in the real-world. Any problem, therefore, in information quality is

due to inadequate representation, and/or incorrect states of representation. If an Information System (IS) represents a different real world state, this (IS) is inaccurate.

Operationalizing such measurements, despite the well-developed definitions, has not been successfully achieved by researchers. Measuring Accuracy has been the most difficult of all since measurements of data accuracy need to make reference to the real world (Redman, 2005). Redman suggested the following to measure data accuracy: the point of measurement, which data to include, the measurement device, and last the level of analysis.

The scale type, (ratio, ordinal, interval, or nominal) is another objective measurement scale. Pipino *et al.,* (2005) cautioned that "lack of attention to scale type can lead to improper interpretation and application of measurement results, especially when combining dimensions to obtain a single metric". Hence, they offered adequately strict definitions for currency, correctness, completeness, volatility, and storage time, which all can be measured using the ratio scale.

To sum up, the research examined both subjective and objective methods of measuring information quality. While all these methods still do not answer for Wang and Strong overall data quality metric, Pipino *et al.,* (2002) two-by-two grid that has high-low subjective assessments on one axis and objective on the other and the three generic forms come close to that. The one of four quadrants mapping that results can be used is a comprehensive information quality instrument. This approach allows a single metric, yet the differences in scale limits metric use (Pipino *et al.,* 2002; 2005).

2.3 Information Quality and Information Sharing Benefits

Pardo et al., (2008) divided the benefits of integrating and sharing information into: technical, political and organisational. Figure 2.2 shows that the benefits of information sharing projects depend upon Information Quality to increase e-Government chances to succeed.

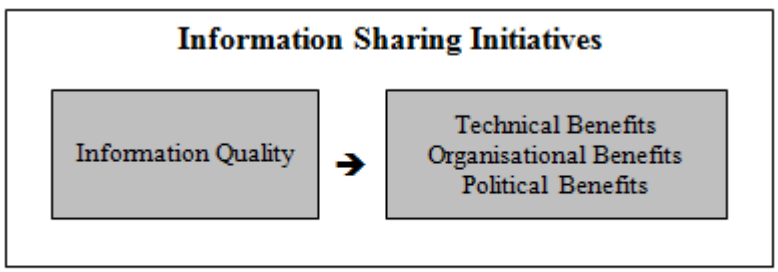


Figure 2. 2: E-Government information sharing relationship with IQ

- Technological benefits: Technical resources along with information can be shared, processed, and/or managed. That inevitably improves information quality.

- Organisational benefits: organisations can benefit as they enhance their problem solving capacity, improve decision-making and coordination, widen communications, and decrease expenses, among other things (Andersen and Dawes, 1991; Gil-Garcia and Pardo, 2005).

- Political benefits: also governments gain great appreciation, achieve credibility and public accountability, own and offer high quality information to the public, and improve planning and delivery services (Andersen and Dawes, 1991). On the personal level, many political gains can be attributed to certain officials in public offices.

2.3.1 Information Sharing in e-Government

Governments can revolutionise their organisational structures as well as facilitate business and yield several different benefits on all levels only by successfully implementing Information (Kraemer and King, 2003). Initiatives of IT and specially information sharing undoubtedly benefit Technological benefits and public sectors. Using technology to efficiently and rapidly share information can, for example, improve the performance of law enforcements and thus reduce crime and make the community a safer place (Cresswell and Connelly, 1999). Another example is the supply chains. Companies can share data of items, forecasts, and any updates related to their products (Clark and Hammond, 1997).

Research on information sharing has become multidisciplinary to include computer science, engineering, management, information science, etc. (Scholl, 2007). Unfortunately, until now there has not been a comprehensively well-researched review of literature to include such disciplines. And if such a review existed, it would usually be the difference between applications in the private and public sectors. Thus, the author endeavours to bridge the gap by, first, discussing sharing information in the context of e-Government

Information sharing in public sector takes place when information is exchanged or given to others (Pardo *et al.,* 2008). That assists different bodies of the government in solving public problems and providing better services to the public. Nowadays, certain complex matters are too much to chew for one organisation and any solution must come from the exerted efforts of many if not all organisations (O'Toole, 1997; Bigdeli *et al.,* 2012) Therefore, it has

become a must that not only the bodies of the same government, but also private and public and non-for-profit organisations work together or else many will fail to provide the services required (Dawes, 2003). Subsequently, Tapscott (1993) and Bigdeli *et al.,* (2012). Not merely sharing but also integrating data and information across government bodies became the pragmatic norm.

2.3.2 Factors Influencing Information Sharing Initiatives

There are many factors for organisations that adopt information sharing initiatives to consider. . Electronic data interchange organisations may consider their readiness, the complexity of the system and the potential benefits, costs, barriers and limitations (Caffrey, 1998; Chwelos *et al.,* 2001; Dawes et al., 2004; Luna-Reyes *et al.,* 2005; Irani *et al.,* 2005; Cresswell *et al.,* 2006; Pardo *et al*., 2008). Zheng *et al.,* (2009) summarised these factors in the three following perspectives:

- Firstly, the technological perspective: organisations use different models or versions or types of software, hardware, protocols, programming language. The more advanced the IT system the easier sharing and integrating information become.

- Secondly, is the organisational perspective: this perspective refers to the nature of work inside the organisation. Generally, centralised bureaucracy and horizontal departmentisation obstruct the flow of information and wastes a lot of time and effort as employees tend to lose interest in sharing information every time they need approval from their superiors. , (Willem and Buelens, 2007). According to Gil-Garcia (2005), "cross-boundary information-sharing gradually increases from the organisational through the inter-organisational to the intergovernmental level."

- Thirdly, political and legal perspective: sometimes sharing- information is part of a legal and/or political situation. Governments general abide by the pressure of courts and pressure groups (Wilson, 1989). Public sector information-sharing projects always require legal acceptance to establish fund and support.

2.4 The Role of Information Quality in e-Government Adoption

Information systems and organisational factors constitute the basis of high information quality (Brown, 2000; Kim and Kim, 2003; Wangpipatwong *et al.,* 2005; Gil-Garcia and Pardo,

2005; Gil-Garcia et al., 2010). Below are the major concepts and results from e-Government literature. First, the research examines information systems input from the perspective which takes information quality to be the product of successful information systems i.e. a dependable variable. Second, a number of information quality studies are discussed to present a thorough knowledge about governmental organisational factors and what they contribute to information quality.

DeLone and McLean (1992) classified six dimensions of what they called information system success: system quality, information quality, individual impact and organisational impact and use and user satisfaction. They further used the information theory to suggest that whereas information quality correlates semantically, system quality correlates technically. These two dimensions contribute enormously towards satisfaction in customer use, eventually impacting the whole organisation.

In their information success taxonomy, DeLone and McLean arranged the categories to show interdependency in success construct. In 2003 follow-up research, DeLone and McLean attributed the difficulty some researchers faced in applying their model to a lack of clarity of dependent and independent variable. Therefore, they modified their taxonomy stating, "this process model has just three components: the creation of a system, the use of the system, and the consequences of this system". Figure 2.3 shows the modified taxonomy.

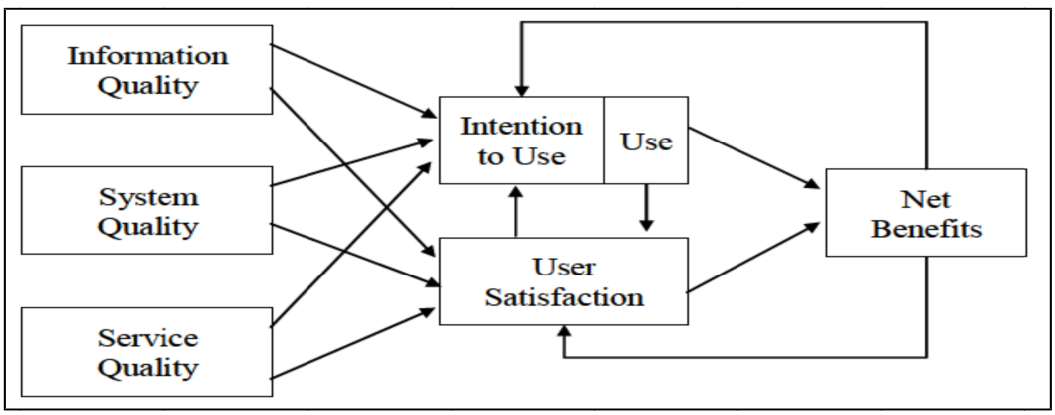


Figure 2. 3: A Modified De Lone and McLean Success Model

In their follow-up study, DeLone and McLean showed how information quality is linked in many studies to system use and benefits. The measuring criteria for quality systems attempted to measure how user-friendly, functional, reliable, and integrated the system was (DeLone and McLean, 2010).

In an Italian study, according to Scannapieco *et al.,* (2005), two government bodies recruited a data production maps methodology to enhance all addresses displayed in public databases. In this example, decentralisation of roles, which mean that two government entities might be responsible for the same task, posed the major problems. The solution was to introduce inter-administration processes and improve intercommunication. Additionally, they developed and implemented a manual for quality check and publish-and-subscribe notification system.

Services-to-Business was another project used by the E-Government Italian initiative (Bertoletti *et al.,* 2005). Services-to-Business enhanced and refined both information quality and the process of providing and sharing itself. In the project, information was also considered a product and not a mere service. A redesign of systems and a central database were the hallmarks of the initiatives. Afterwards, when an agency interacts with a business which means it interacts with the government. Services-to-Business quickly succeeded as it eliminated incorrect data and reduced the costs by 40%.

Yet a third example described by Kerr and Norris (2004) showed a case to improve clinical data quality employed by the Ministry of Health employ the TDQM. A comprehensive data quality assessment framework was devised to address all data reported to and by the ministry. This information quality enhancement framework has since become a tool for measuring data quality, a model to evaluate future projects and an internal and external user template.

Kerr and Norris defined stakeholder priorities and needs for the framework by interviews, open-ended questionnaires, and focus groups among other qualitative techniques. The framework was later refined and modified by a pilot study of three totally different health data collections deeming it extremely useful to developers and hospital staff in charge of clinical data submission to the government. The New Zealand Ministry of Health is working to use the benefits of this project to construct other comprehensive initiatives aiming at enhancing quality.

2.4.1 Ensuring Success in Information Strategies and e-Government

E-Government by developing organisational structure, interacting with people and business, reducing costs of government processes aims at modernising and revolutionising the public sector (Cabinet Office, 2000). In addition to providing quality information to all, E-Government creates easier and faster channels for sectors, people, and businesses to

communicate effectively and efficiently.. This strategy results in improved information sharing and better government strategies, polices, processes, and transactions (Heeks, 2001).

Understanding how information technology works in organisations along with other factors is the main success strategies of implanting such projects. Garcia and Pardo (2005) stressed that for e-Government strategies to succeed, they must adopt a systematic approach with long-term approaches goals. They list the success factors of e-Government initiatives in the following guide:

- **Information Quality Strategies:** They ensure top quality information by (a) an inclusive information management plan; (b) a program to ensure information quality; (c) agreements on standard criteria for data sharing; (d) constant feedback, and (e) training (Brown, 2000, Burbridge, 2002).

- **Information Technology Strategies:** Usefulness and ease e-Governemtn system is a key indicator of its success (Brown, 2000; DeLone and McLean, 2003; Garson, 2003). Information technology strategies should always (a) build system prototypes and raise awareness; and (b) attain expert technical skills (Garson, 2003).

- **Organisational and Managerial Strategies:** Basically IT projects must have realistic and measurable objectives to fully succeed (Melitski, 2003). In addition, other factors including: (a) involving stakeholders in developing projects; (b) deploying techniques of strategic planning; (c) stimulate improving business processes and services; (d) training and availability of technical skills and expertise; and (e) developing financial arrangements and partnerships (Mahler *et al.,* 2003).

- **Regulatory and Legal Strategies:** To achieve susses, E-Government regulations also help strengthen the framework used which means the regulations available need to be adapted to encourage customers to use emerging technologies(Kim *et al.*, 2003).

- **Environmental and Institutional Strategies:** these strategies include (a) leadership to influence policy makers; and (b) strategic outsourcing (Chen and Perry, 2003).

e-Government objectives of information sharing strategies and projects are not mere means but also an end as they contribute substantially to the more efficiency in government processes, extra savings, better quality services, and more effective communication with end

users(Helbig *et al.,* 2009; Zheng *et al.,* 2009). Still, Scott *et al.,* (2011) think that research has not yet fully identified e-Government success measures of information-sharing capacity.

2.4.2 Quality of Information in e-Government Services

The literature shows that information sharing and integration in governments can result in information quality. E-Government aims to serve institutions and the population alike by making available to them the information to help them fain convenient services with the least amount of effort, time and money. The benefits of e-Government services are a two-way process since citizens get cheaper and quicker services and the more people use these services the cheaper they get (Gouscos *et al.,* 2007). That's why more and more governments are using the e-Government services system like Korea, Nigeria, and South Africa.

According to the IS Model (see Figure 2.3), information quality tries to measure the production of the system. Wangpipatwong *et al.,* (2005) studied what leads to adopting e-Government website to measure quality of information and focussing on the features of the information such websites produce. In general, the information quality was accurate, timely, relevant, precise and complete. As a result, a study of e-Government website aims to explore which of the above characteristic significantly impacted the implementation of e-Government portals. Wangpipatwong *et al.* state that system quality and information quality are crucial reasons why e-Government services are adopted. They too suggest that accuracy, completeness and relevance were more important than precision and timeliness. Efficiency came as the most important of all factors.

Furthermore, the study conducted by Wangpipatwong *et al* resolved that the lack of information regarding what e-Government website to refer to and what kind of services were available, the lack of the wanted application forms or information, inadequate guidelines, low trust in the system, and the system slowness are the great hindrances influencing the use of Government websites. On the other hand, they showed that to induce users and customers, e-Government websites have to be attractive, build confidence and reinforce the security. Colesca *et al.,* (2008), whose research was focussed on adapting e-Government use, named the IQ dimensions as ease, trust, usefulness, accuracy, security, and relevancy. In addition, other factors like demographic impact and user satisfaction were also analysed. Another study on user satisfaction as well as demographic impact disclosed that the users' keen awareness of usefulness, trust, and ease e-Government services positively influence customer satisfaction therefore indirectly increasing adoption of e-Government services. For e-Government

facilities and services to be utilized efficiently, intense and awareness campaigns ought to be heightened, aiming to target potential users to educate them on the benefits and values the will gain (Colesca *et al.,* 2008).

2.5 Limitations of Previous Studies

Examining existing literature shows serious limitations of the available research:

- A comprehensive understanding of information quality and it influence on organisation performance is still lacking.

- Even more, the existing literature pays little attention to the public sector whereas most studies have been applied on the private one.

- Rarely has information quality itself been taken as a contributing factor to the success of e-Government initiatives.

- Much of the research has paid little attention to theatrical foregrounding and rather mostly remained descriptive. The research even does not demonstrate causality.

Therefore, this thesis endeavours to develop a model to better explain information quality attributes and links between these attributes that influence the performance of e-Government projects.

2.6 Summary

The chapter examined the literature on the areas of information, information quality, the relationships between them and organizational performance. The author reviewed and explored different views and definitions of quality highlighting several different arrangements and dimensions of quality information and its use. Measuring and managing information quality was next explored to define the gaps and research stream. Furthermore, success factors of e-Government and a discussion of different interpretations on strategies of e-Government success are followed. Finally, the author traced the gains of sharing information and how information quality helps achieve e-Government strategic benefits and improve performance in organisations.

This chapter manages to set the pillars in order to construct a conceptual model as well as build the contextual framework. Information quality research and e-Government strategic benefits can easily be viewed by the model the research developed. Most importantly, the research framework helped the researcher scrutinise a group of strategic relationships between organisational success and information quality. Investigating this relationship between information quality and operational success, the thesis will enrich current research by investigative the nature strength, and direction of possible links between initiatives to increase the quality of information and the success of e-Government initiatives. The conceptual framework and the different features of information quality and the benefits of e-Government will be the main focus of the next chapter. The discussion will highlight that from perspectives of the strategic and institutional value and their impacts on organisational performance. Bringing these factors and their relationships together formulates the fundamental hypothesis for this study.

Chapter 3: Developing a Conceptual Model

3.1 Introduction

This research attempts to develop a model to improve the quality of information sharing projects that impact e-Government strategic benefits. In this chapter the researcher combines all information quality causes and benefits of e-Government that are recognized in the literature review to help create a conceptual framework model for e-Government information quality. Therefore, the conceptual model proposed here examines the relations between factors of information quality and benefits of e-Government. Besides building up the relations between information quality and benefits of e-Government, the model also constitutes a road-map to empirically collect collection and carry out analysis, on existing literature on e-Government (Kaplan *et al.*; Ballou and Tayi, 1998; Redman, 19981999). The three key research gaps that generate the motivation for the research are presented in Chapter 2. First, the available data quality research, in addition to being limited, focused on private organisations almost neglecting government institutions (Scholl, 2007). Second, literature on e-Government success has seldom explored information quality considering it a contributor to e-Government initiatives success. Third, the connection between e-Government strategic benefits, information quality and organisational value has not adequately been studied so far, with relatively minimal theoretical grounding.

To investigate the above research gaps thoroughly, the research model in this chapter is developed through the sections detailed below. In section 3.2, a number of information quality factors are discussed (soundness, usability, usefulness, and dependability). These factors are derived from IQ/PSP information quality model. Section 3.3 discusses numerous information quality measurement methods focusing on state-owned entities and information quality benefits. Next Section elucidates the impacts factors of data quality on e-Government success. Finally, section 3-5 proposed a conceptual model and hypothesized links between research variables. Lastly, Section 3.6 has the summary and conclusions.

3.2 Information Quality Factors (IQ/PSP Model)

As previewed in the literature, there are some common conceptual models, including: Strong and Wang (1996), Jarke and Vassiliou (1997) and Ballou *et al.,* (1985). They mainly that take information as physical products, and yet as a service – one which cannot be preserved (Ballou *et al.*; 1985) . Kahn *et al.,* (2002) recognised that data quality can be a service. They further used the literature on quality in order to detect more ways to describe the concept, adopting two for their purposes: conformity with specifications and meeting and or even exceeding the expectations and needs of customers. Together, the two features with the product/service feature of information quality helped Kahn *et al.* advance an important extension of the model Strong and Wang devised and named it IQ/PSP which stands for "Information quality/product and service performance".

IQ/PSP is a model is mapped on a two-by-two grid (see Figure 3.1), which illustrates the different dimensions of information quality, represents service and product quality in the rows and specifications versus expectations in the columns. The two-by-two grid model represents each of the four sides and briefly describes them. Product-conformance and product-expectations are termed as 'sound information' and as 'useful information', respectively. On the other hand, service-conformance and service-expectation are represented as 'dependable information' and 'usable information' respectively. The information quality concepts discussed in this research are based on the IQ/PSP model of the four information quality quadrants: Sound, Usable, Useful, and Dependable information shown in Figure 3.1. The multi-dimension quadruple complex is used in this model. Dimensions like error-free and completeness, for example, are found in the Sound information section. IQ/PSP model includes the exact dimensions for the four quadrants. The conceptual model (see Figure 3.2 below) is developed based on the IQ/PSP model to explore the relations between the dimensions of data quality and their relationships to e-Government performance and benefits (Kahn *et al.,* 2002). The researcher called it IQBP model (Information Quality Benefits and Performance). The conceptual framework adopts the product and service performance model or IQ/PSP. In the sections below, the researcher describes each quadrant of information quality and demonstrates the definitions and classification of each dimension in the four quadrants.

	Conforms to Specifications	Meets or Exceeds Consumer Expectation
Product Quality	Sound Information • Free Of Errors • Concise Representation • Completeness • Consistent Representation	Useful Information • Appropriate Amount • Relevancy • Understandability • Interpretability • Objectivity
Service Quality	Dependable Information • Timeliness • Security	Usable Information • Believability • Accessibility • Ease of Manipulation • Reputation • Value-Added

Figure 3. 1: IQ/PSP Model (Source: Kahn et al., 2002)

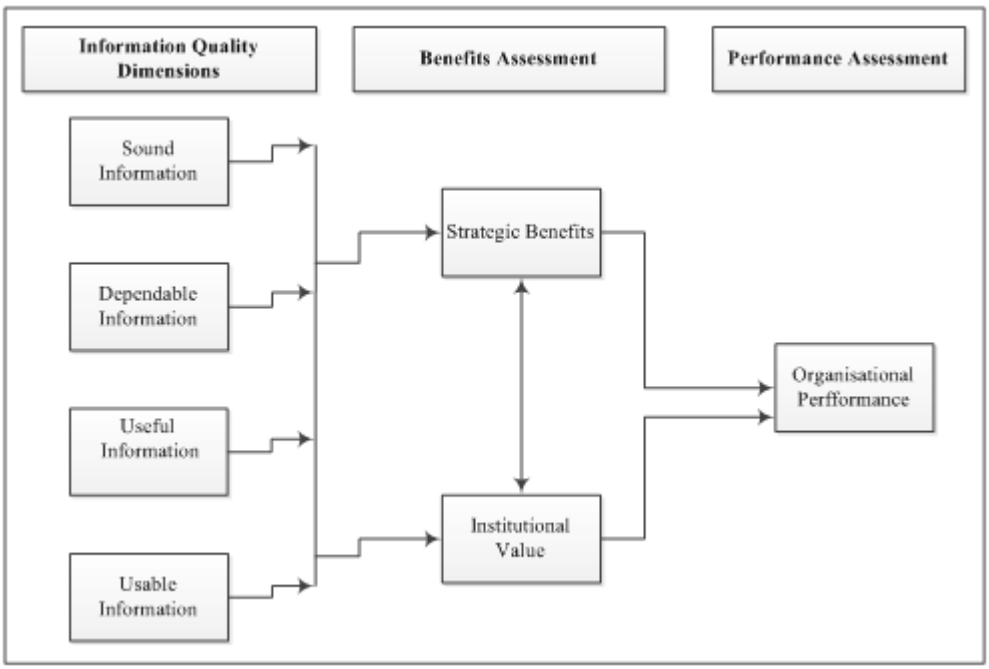


Figure 3. 2: The Research Conceptual Model (IQBP Model)

3.2.1 Sound Information

Information quality dimensions in sound information quadrant are measurable and tangible. The soundness of information is ordinarily not dependent on task and decision. The quality dimension this quadrant includes is shown below in Table 3.1.

Sound Information (Product Quality) - Definitions	
Free of Errors	Information is correct and reliable.
Concise Representation	Information is compactly represented.
Completeness	Information is not missing and sufficient to the task in hand.
Consistent Representation	Information is presented in the same manner.

Table 3.1: Sound Information

An information user wants accurate and error free information. Accuracy is the extent to which data value matches a reliable and correct value. Accuracy also depends on correctness measurements and reliability of information sources. Errors in data can be measured by a metric defined by Pipino, J et al., (2002). According to Pipino some data items in error can be divided by the total of data items subtracted from one. Practically, a set of well-defined criteria is required to know what makes up a data unit and to define an error. Some incorrect character can be tolerable in a particular. Dimension of representation is as the extent to which information is strictly represented with no irrelevant elements (Wang and Strong, 1996). It is crucial for Representation to be concise because that delivers the required information adequately, easily, and comprehensively.

Lack of information is result in poor decisions and false conclusions. Completeness dimension, which leads to various metrics, can be viewed from several standpoints. There is the schema completeness concept, the point to which attributes and entities are not missing. At the level of data, column completeness is a role of the absent values which is similar to Codd's (1982) column integrity that evaluates values which missing. Thirdly, population completeness which indicates that the population is not complete when a column which contains one occurrence of, say, 50 states, only covers 43 states. Every one of the above (schema, population, and column completeness) could be measured by the ratio of the sum of incomplete items to the entire number of items subtracting from one (Pipino *et al.*, 2002).

For example, customers have to know what style is being used to represent different data, whether 17/07/97 means July 17, 1997 in American style, or July 7, 1997 in European one. Consistent representation guarantees a minimum amount of interpretations and therefore understanding. Here consistency is viewed from different angles; one perspective is when data values are the same throughout the tables. An example is Codd's (1982) Referential Integrity constraint. A metric consistency measuring, thus, is the ratio of violations of a specific consistency type to the total number of consistency checks subtracted from one (Pipino *et al.*, 2002).

3.2.2 Dependent Information

The quadrant of dependable information that represents service quality and its conformity with quality considers the basic features required to ensure the delivery of high quality information, according to (Khalil *et al.* (1999). And so, IQ dimensions may only be assessed soon after information is delivered. Information, like all services, can be appraised just after delivery. In Table 3.2 the quality dimensions of this section is clarified.

Dependable Information (product Quality) - Definitions	
Security	Information is protected to maintain its security.
Timeliness	Information is up to date for the job in hand.

Table 3. 2: Dependable Information

The dependable information part looks at the processes and procedures which delivers information securely and timely. Hence, it has the security and timeliness quality. The former is about protecting the information and the systems against any illegal access, denial of service, and violation of data integrity (Kahn *et al.,* 2002). Information security detects, documents, and counters these threats. Information security includes computer and network security, too. Safe-guarding an organisation's data assures information consumers of the data's availability, integrity, and confidentiality.

Dependable information is current, secure and provided in a timely manner to support the task in hand. In other words, the dimension timeliness reflects how up-to-date the data is with respect to the task it is used for. A general metric to measure timeliness has been proposed by Ballou *et al.,* (1998) who suggest timeliness to be measured as the maximum of one of two terms: 0 and 1 minus the ratio of currency to volatility. Here, currency is defined as the age plus the delivery time minus the input time. Volatility refers to the length of time data remains valid; delivery time refers to when data is delivered to the user; input time refers to when data is received by the system; and age refers to the age of the data when first received by the system.

3.2.3 Useful Information

The dimensions of IQ in useful information part are characteristics dependent on task. Quality information is pertinent to user's task and supports making decisions sufficiently: the more

objective the information, the more confident the consumer.. Table 3.3 names and summarises the useful information dimensions quadrant.

Useful Information (Service Quality) – Definitions	
Appropriate Amount	The amount of information is suitable for the task at hand.
Relevancy	Information is applicable for the job in hand.
Understandability	Information is easily understood.
Interpretability	Information is in appropriate symbols and units and the definition is clear.
Objectivity	Information is unbiased and impartial.

Table 3. 3: Useful Information

A working definition of the appropriate amount of data should reflect the data quantity being neither too little nor too much. A general metric that embeds this trade-off is the minimum of two simple ratios: the ratio of the number of data units provided to the number of data units needed, and the ratio of the number of data units needed to the number of data units provided (Pipino *et al.,* 2002). It is crucial to provide users with information they can understand and interpret. They want it to be relevant to their domain and purpose of interest in a given context. Criteria regarding the domain and purpose of interest are therefore specific to the user and the task in context, and determine the desired information pieces. Therefore this suggests that an information product can only be said to be useful and relevant if the information meets the customer's specific criteria or expectations (Khalil *et al.,* 1999).

Understandability is related to the clarity of information. Any high quality information system must concisely present information that is easy to understand and interpret (Lee *et al.,* 2002; Huang *et al.,* 1999). Palmer (2002) believes that ease of interpretation creates a desired perception of use. Moreover, Wang *et al.,* (1996) believe interpretability is "the Understandability of the syntax and semantics of information", buy they too maintained that users' interpretability could be a lot wider, to practically demanding that "the thing speaks for itself".

Objectivity, finally, makes sure information is presented accurately, completely, clearly, reliably and in an unbiased manner (OMB, 2001). Scientifically, any supporting information should be generated, and, using efficient research and statistical methods, the results should be analytically developed.

3.2.4 Usable Information

In this quadrant the IQ dimensions differentiate a service from another. This can be evaluated only from the viewpoint of the user depending upon the decision or task in hand (Khan *et al.,* 2002). Consumers must access information and adapt it to their special needs.. For consumers, information must be authentic and reputable, and beneficial (Khan *et al.,* 2002). Benefits of information are usually abstract and thus hard to measure, but these benefits remain important to providing high quality information. A broker service providing online services, for instance, provides valuable and usable information when investors generate more profits and spend less time than they do when using conventional broker services. Investment information is dependable, sound and relevant even if investors do not essentially want to use it. The Usable Information quadrant dimensions are described in Table 3.4.

Usable Information (Service Quality) - Definitions	
Believability	Information is regarded as true and credible.
Accessibility	Information is available, or easily and quickly retrievable.
Ease of Manipulation	Information is easy to manipulate and apply to different tasks.
Reputation	Information is highly regarded in terms of its source or content.
Value added	Information is beneficial and provides advantages from its use.

Table 3.4: Usable Information

Believability is the extent to which data is regarded as true and credible. Among other factors, it may reflect an individual's assessment of the credibility of the data source, comparison to a commonly accepted standard, and previous experience. Each of these variables is rated on a scale from 0 to 1, and overall believability is then assigned as the minimum value of the three. As Pipino *et al.,* (2002) explains the believability of the data source is rated as 0.6; believability against a common standard is 0.8; and believability based on experience is 0.7. The overall believability rating is then 0.6 (the lowest number), this is a conservative assessment but an alternative will be to compute the believability as a weighted average of the individual components (Pipino *et al.,* 2002).

A similarly constructed metric can be used to measure accessibility, a dimension reflecting ease of data attainability. The metric emphasizes the time aspect of accessibility and is defined as the maximum value of two terms: zero or one minus the time interval from request by user to delivery to user divided by the time interval from request by user to the point at which data is no longer useful (Jarke and Vassiliou, 1997; Pipino *et al.,* 2002). A sensitivity factor in the form of an exponent can also be included.

Lee et al., (2001) therefore argue that if data is delivered just prior to when it is no longer useful, the data may be of some use, but will not be as useful as if it were delivered much earlier than the cut off. Thus, the metric trades-off the time interval over which the user needs data against the time it takes to deliver data. Here, the time to obtain data increases until the ratio goes negative, at which time the accessibility is rated as zero (maximum of the two terms).

According to Wang et al. (1998), Value added dimension refers to the advantages and benefits quality brings about. Juran (1988) defined quality as "fitness for use", which indicates quality is a customer concept, i.e. customer satisfaction and quality almost the same. Therefore, quality is often considered to be meeting or even exceeding user needs—a flawless product may not have any value if it does not fulfil customer needs. Juran devised the term "cost of quality", because he believes that money values are related to quality problems and efforts of quality management. PSP/IQ is an instrument used to evaluate and conceptualise information quality and functions as a theoretical basis for IQ data collection and analysis. The four PSP/IQ quadrants: Dependable, Usable, Sound, and Useful information can be the foundation for assessing how institution improving their products and services. The section below describes both the subjective and objective measurements of information quality and gives a representative example of subjective measurement using the PSP/IQ model.

3.3 Measuring Information Quality

Managing things requires that they be measureable. The same applies to information quality (Stvilia et al., 2007). In order to verify the conceptual model of the research (benefits of Information quality and performance-IQBP), governmental organisations require a measurement of information quality dimensions. In the coming section, the researcher begins by discussing information quality measurement in an e-Government setting, and then moves to the usage of IQ/PSP model in measuring information quality dimensions in an e-Governmental context.

3.3.1 Information Quality Measurement in e-Government

One of the major complexities in dealing within a public sector context is being able to measure the outcomes or even measuring the outputs in meaningful ways. The latter places serious restrictions on the capacity to apply concepts of quality derived from the private sector (Hughes and Teicher, 2004). Consequently, whilst the intention is to improve quality

standards, the ways of doing so have increasingly shifted to other mechanisms, such as explicit contracts and privatisation, separating service provision agencies from policy and, most recently, from e-Government (Naumann and Rolker, 2000). Furthermore, in the context of quality in e-Government service delivery, one can distinguish two main approaches: the first includes the models that view the issue of quality from a more introvert' standpoint. For example, Six Sigma is one of these models which have successfully been used to improve performance in organisation (Papadomichelaki *et al.,* 2006). Such models see quality as an issue which stems from within the organisation and has an impact on the front office. This indicates that – since the quality of services delivered is influenced by a number of aspects within an organisation (e.g. back office procedures, leadership of the organisation, management's dedication to quality), an assessment and continuous monitoring of the above aspects will inevitably improve the overall quality of services delivered. The field from which the monitoring borrows the elements to measure and assess is the organisation itself and includes all the levels of management in addition to the employees (Papadomichelaki *et al.,* 2006).

Table 3.5 highlights the second approach that focuses on the quality of the service delivered. It is a more 'extrovert' view, since it emphasises the way in which the client receives the services from the front-office website. It is a customer-oriented approach, motivated by the customer's needs. The quality dimensions of this approach are related to the service delivered (e.g. its availability, usability, security, etc.) and/or input from the receivers of the service (e.g. customers' priorities and needs). The models of the 'extrovert' approach can be divided into three sub-categories:

- The first category includes models that measure customer satisfaction with the public authorities. Customer satisfaction is affected both by the quality perceived by the citizens and from their expectations about the service. Many factors comprise perceived quality and are taken into account when measuring satisfaction.
- The second category pays attention to the portal's characteristics, if they influence the perceived quality. These models focus on interface issues that influence the final qualitative result, so their quality dimensions are appropriate for the front-office.

- The third category includes models that focus on the Quality of Service (QoS) for web service. The quality dimensions derived from this category concern technical characteristic of web services that influence the perceived quality of a service based on web services.

Quality	Introvert Standpoint	Extrovert Standpoint
Focus	Organisational	Services
Assessment	Leadership Back Office Procedures	Availability Usability Security etc.

Table 3.5: Quality in Introvert & Extrovert Views

The most important aspect of e-Government, according to Papadomichelaki *et al.,* (2006), is quality. They highlight that quality originates internally, back office, and that those introvert quality practices necessarily influence the front-office, or its extrovert aspect. Basically, citizens interact with the front-office. Government institutions, hence, have to make sure the entire operations and structure are based on quality.

3.3.2 Subjective Measurement in Governmental Organisations (IQ/PSP)

Using data they collected from three healthcare organisations, Kahn et al., (2002) conducted a study to validate the PSP/IQ model. They used a 70-item questionnaire, which were used in other research and proved to be valid and reliable, to assess the data about IQ dimensions. Consequently, this thesis embraces the element of PSP/IQ to investigate attributes of quality information.

The four quadrants in the IQ/PSP model offer a standard tool to evaluate how efficiently organizations construct and develop sound as well as useful information, and provide dependable and usable data to customers. (Strong *et al.,* 1997; Tayi and Ballou, 1998). This assessment is much needed to detect any aspect that requires more improvement and to start to develop information quality benchmarks. Producers and receivers of information must be involved in the process of assessment to ensure the highest level of accuracy.

- The IQ/PSP model through its four quadrants/dimensions is used to understand the quality of information provided. In this case the government provides the information to its citizens, users, and the information is exchanged between government departments.

3.4 Information Quality Impact in e-Government

E-Government chiefly aims to enhance service quality, maximise administrative processes efficiency and allow more effective and greater participation and importance engagement with the users of the service (Helbig *et al.,* 2009; Gronlund and Horan, 2004). Poor data quality has negative bearings on all levels of government organisations (Redman, 1998). Operationally, poor data means customer dissatisfaction, extra cost, and job dissatisfaction. Tactically, poor information undermines the decision-making process. Lack of accurate, complete, timely, and relevant information could be the sole biggest obstacle that prevents developing effective e-Government strategies (Redman, 1995).

Liao and Wang (2008) empirically confirmed the D&M Information System e-Government success. While Teo *et al.,* (2008) considered in their research the relation between credibility and e-Government projects (Connolly *et al.,* 2010) examined service quality impact via an e-filing tax system. Only very basic studies have been carried out to identify the measures governing the impact of enhanced IQ to the performance and benefits of the public sector despite the fact that researchers have applied Success models of IS in several different contexts (mainly in the private sector), (Torres *et al.,* 2005; Gouscos *et al.,* 2001; 2007). This section outlines the effects quality information has on e-Government bodies that take part in sharing information and those who need and use this information. McLean and DeLone's success model is utilised in this research to foster the relations between e-Government success and information quality. Further, the section studies the participants as well as the consumers of information in government entities.

3.4.1Mapping IQ Factors to Benefits of e-Government (IS Success Model)

In their landmark article of1992, DeLone and McLean they explored the concept of IS success considering it a dependent variable, establishing six-dimension IS success taxonomy: system quality, use, user satisfaction, information quality, organisational and individual impact. DeLone and McLean related this classification to information theory suggesting that system quality should correlate to the technological level, while, data quality should correlate to the semantic and syntactic level, hence contributing to customer satisfaction. This leads to individual impacts, which eventually impacts the whole organisation. The dimensions, in this taxonomy, are arranged in such a way to imply a success construct that is interdependent, and to maintain the sequential, time-based aspect of information flow and impact.

McLean and DeLone (2003) followed that up and explored the research conducted based on the model of 1992. And they noticed difficulty stated by some scholars applying the 1992 model (such as Seddon and Kiew, 1994; Etezadi-Amoli and Farhoomand; 1996Rai *et al.,* 2002). They partly traced the difficulty to the lack of clarity about independent variables and dependent ones. Therefore, they utilized a process base model to express originality and clarity, affirming that "this process model has just three components: the creation of a system, the use of the system, and the consequences of this system." Further, they present an improved model, by adding service quality as a new dimension, and another dimension they called net benefits which is the combination of organisational and individual impacts (see Figure 3.3). This research employs McLean and Delone's 2003 model since the model relates to benefits of e-government benefits and performance qualities and will assist in investigating e-government strategic benefits and information quality and their relationships. Figure 3.3 shows that the quadrants of information quality: Sound, Useful, Usable, and Dependable information all relate to Delone and McLean's model: Information quality, Service quality and System quality.

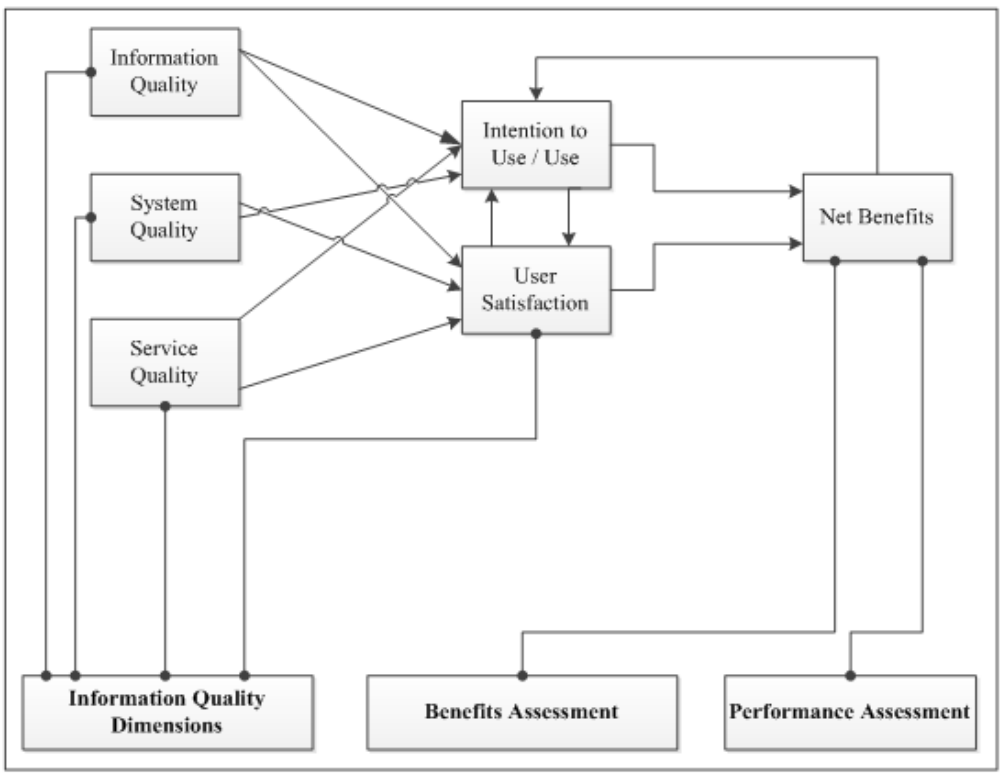


Figure 3. 3: IS Success Model (Delone et al., 2003) used in Research Conceptual Model

This research adopts Information System Success Model of McLean and Delone (2003) in order to measure institutional performance. The mapping between measures of information quality in the present research as well as the measures of quality proposed by McLean and Delone (2003) are displayed below in Table 3.6.

Delone (2003) Quality Measures	Information Quality Measures in Present Research
Information Quality	Sound Information Useful Information
System Quality	Dependable Information Usable Information
Service Quality	Usable Information

Table 3.6: Delone (2003) Quality Measures Mapping to IQ Measures in Research

Scott (2009) studied e-Government benefits to expand previous research on e-Government drawing a comprehensive set of benefits. Benefits of e-Government necessitate striking balance between effectiveness and efficiency measures (Moore 1995). Like Moore (1995) and Meehan and Grimsley (2007), Scott's benefits revolve pay attentions to three prime purposes i.e. effectiveness, efficiency and democracy. The three goals reflect the huge gaps apparent in the literature of the research and as defined by the US, the EU and the UN. This classification was formerly used to assess the result of e-Government initiatives (Gronlund and Ask, 2008). In Table 3.7 below, the fundamental e-Government benefits are listed and defined showing the most likely government goals to initiate e-government project.

Benefit	Definition	E-Government Goals
Cost	Cost saving to the user from using the online channel	More efficient services
Time	Time saved by using the online channel	More efficient services
Communication	Efficient method of communicating with local/central government	More efficient services
Avoid Personal Interaction	To receive public services without having to interact with service staff	More effective services
Control	The ability to exert personal control over the service	More effective services
Convenience	The ability to receive the service how and when the individual wants it	More effective services
Personalisation	The ability to tailor the service to the individual	More effective services
Ease of Information Retrieval	Useful and helps the user understand the service	More effective services
Trust	Increase in trust and confidence in Government	Improved democracy
Well-informed	Better informed, knowledgeable about government policy	Improved democracy
Participate in Decision-Making	Involved, exert influence in the democratic process	Improved democracy

Table 3.7: E-Government Benefits *(Adapted: Scott et al., 2009)*

The previous discussion offers a broad appreciation of e-Government benefits and the requirements of information quality dimensions. Below, the researcher tackles performance, institutional value, and strategic benefits, which are the paradigms of the IQBP model.

3.4.2 Elements of e-Government Strategic Benefits

Strategic benefits are adopted as a variable. First, the section explains the role strategy performs in e-Government and later lists strategic benefits dimensions the current studies uses. An e-Government strategy is crucial to modernise the public sector, by recognising and enhancing institutional structure, communication with business and consumers and lowering cost and reducing processes in organisations (Gouscos *et al.,* 2007). Strategy delivers a huge amount of information to people and businesses via the Internet. Still, e-Government does not only to offer users with information that commercial firms can offer. E-Government establishes strategic links with the public sector and facilitates communication between government levels (Ebrahim and Irani, 2005). This promotes the cooperation both by making it easier and simpler for government policies, processes, and strategies to be obtained and executed by improving the use of government data and resources (Heeks, 2001). Normally, governments provide public employees with information over the intranet or the Internet and can allow for transfer money electronically. Tyndale (2002) believes e-Government improves and facilitates communication across all government departments and therefore users do not repeatedly ask for the same data from other service providers.

Introducing e-Government requires a strategic verdict and a profound change in processes. When government bodies implement e-Government, it is imperative to integrate e-Government initiatives and strategic plans to guarantee success. The more thorough the strategic planning process, the more effective is. The overall strategy of e-government must be made known to prominent stakeholders: all government divisions, citizens and private businesses using the e-Government, so that they appreciate e-Government initiatives. E-Government simplifies government procedures, reorganises the actual government departments and motivates internal change (Gil-Garcia and Pardo, 2005). Cost savings, better-quality communications and greater coordination, extended citizen participation and more government accountability are but some benefits of e-Government initiatives (Koh *et al.,* 2006).

Koh *et al.,* (2006) tackle the government's strategic readiness to implement e-Government successfully. Strategic readiness in this regard is a state of long-lasting, organisation-wide willingness and preparedness to achieve large-scale systemic change in order to successfully implement e- (OECD, 2003). An institution can investigate its strategic preparedness to plan and align its objectives and business processes with the information system, which might also include re-orientating their culture and structure so that value per user as well as users per service are maximised (Gouscos *et al.,* 2007; OECD, 2003).

Aligning organisations is considered a complex process because it includes setting strategic direction, mobilising efficient systems and making necessary adjustments. Generally, organisations require vertical alignment and horizontal alignment (Canzer, 2003). The former focuses on strategy, while the latter on customer needs. To accomplish vertical alignment, all staff members must understand not only organisational system and strategy but also their role in achieving it. The system needs to endorse the benefits of the online self-service to residents and businesses. Fostering customer trust and highlighting the benefits of speed, convenience and cost are appropriate strategies to encourage e-Government self-service (Soliman and Affisco, 2006).

E-Government require governmental decisions and a strategy to achieve defined objectives and exceeds merely developing initiatives to providing services (Fountain, 2001). Applying IT to government includes organisational processes, policies and technology to reach public objectives. Moreover, IT generates new activities, services and functions that had not formerly been contemplated, leading to more participation from government bodies in information technology decisions (Gouscos *et al.,* 2007; Gil-Garcia and Pardo, 2005). Therefore, a process of "reinventing government" to reconsider its functions and how they are performed is needed for e-government initiatives to succeed. The more public administration is involved in IT strategic decision, the more forms of collaboration and participation emerge, which revolutionise essence of public administration activities (Gouscos *et al.,* 2007). Rather than creating new markets or expanding the available ones, like in e-commerce, services and activities here are generated to strengthen government action (Gil-Garcia and Pardo, 2005).

The development of the economic sector, for example, can be generated when companies of complementary or similar functions work closely together. A website with suitable characteristics works as catalyst to encourage policies. Offering services 24/7 increases operational efficiency (reduced costs and increased productivity) and provides high quality services, products and systems (Gil-Garcia *et al.,* 2005).

This study tailors Montagnas' (2005) strategic benefits proposed items to give the following remarkable performance in e-Government:

- Quick reaction to users' needs.
- Consolidated services.
- New and innovative e-Services.
- New communication and operation channels.
- Closer relationships between partners.
- Knowledge of users' needs.
- Development of human resources.
- Increase use of e-Services.

To sum up, strategic benefits of e-Government cover several practices such as developing a technologically feasible organisational structure of government entities that to modernise public sector and prepare it to communicate, coordinate and cooperate within (vertically) and with and the public (horizontally).

3.4.3 Elements of e-Government Institutional Value

Organisational value is yet one more e-Government variable in this thesis sine e-Government is increasingly focusing the attention toward add value-added services, rather internal efficiency (Melitski, 2003). Further, transparency, which has evolved from a catchword into a functional policy tool, has made it necessary for governments to make government information easier to access and more interactive to help regain public trust (Moon, 2003; Chadwick and May, 2003). This work makes transnational players more environmentally and socially accountable and responsible (Mulgan, 2000). Diverse organisations like transnational corporations, global financial institutions, and nation-states have been demanded to demonstrate openness and disclosure. Institutional value and Transparency reflect wider institutions' credibility, better institutional image, constant actions control, close monitoring of public services, government tracking and more vigorous contribution in all government activities. According to, Connolly and Bannister (2011) to decide the acceptable transparency in public administration, there must be four values to keep: beliefs, good governance, risks and costs of delivery and to guarantee personal privacy to public servants.

Firstly, the public has every right to know. In a democratic and transparent government, the citizens pay for the government and it represents them. The term "public servants/representatives" dictates they are accountable to the voters and payers. Accountability that lacks transparency has but little value – we must know what certain people are doing to hold the accountable. Florini (2004) believes people have the right to know in general and particular situations. For Stiglitz (2003), in a democratic state "… there should be a strong presumption in favour of transparency" (p.116).

Secondly, improved governance guarantees delivery of public services to reflect values such as integrity, efficiency, honesty, and fairness (Bovaird and Loeffler 2002). Transparency is thus integral to good governance (e.g. Nanz and Steffeck, 2004; Kim *et al.,* 2005). But more subtly, transparency could be incompatible with some practises of good governance.

Third, transparency has risks and costs of delivery. One old-fashioned disagreement over transparency is that it is costly (Breton et al., 2007). Information and communication technology changed the finances of transparency electronically. In addition, there are risks to privacy issues or of exposure to legal and regulatory action, such as hacking, (Hu and Zhou, 2008). Politicians and decision-makers have to weigh up risks the benefits of transparency to make sure citizens enjoy privacy and security.

Fourth, and last, Transparency should not violate the rights of public servants to privacy personally and professionally or undermine public administration's ability to function effectively (Zhou and Hu, 2008). Privacy in certain work places could become a main source of dispute. The question some raise is to what extent citizens should be allowed to watch public servants. This transparency paradox, a public administration version, is extensively discussed from finance to medicine (Connolly and Bannister, 2011). Montagna's (2005) represents 5 dimensions of e-Government value (listed below). They are very suitable to use in this thesis to test the IQBP model.

- Greater credibility in institution.
- Improvement of institutional image.
- Government tracking from any place.
- Inspection of public services.
- Active participation in all government actions.

3.4.4 Elements of e-Government Performance

Basically, e-Government focuses on the providing high value services to citizens and businesses. It endeavours to boost access to government services to help businesses, citizens, partners, stakeholders and also government employees (Silcock, 2001). Therefore, measures of e-Government performance will focus on the performance and quality of the citizen-oriented services and on how the objectives are met (Montagna, 2005).

Steayert (2004) states that US citizens are benefit greatly from visiting government websites. For instance, among the benefits visitors gain from National Institute of Health (NIH) is the high efficiency in obtaining answers for any queries they have. Customised information, organisation, and powerful search engines are particularly helpful here. When e-government websites surfers easily browse them for services and orders which are instantly and professionally responded to, that indicates the success of the e-Government projects (Verginadis *et al.,* 2003). A high number of NIH site visitors said they had better understood their treatment after visiting thesis. Governments, which have no competitors, must fulfil a complex set of needs. A government bases its behaviour on norms to ensure achieving its objectives. The judicial capacity of a government is social performance, and a government's distinct activity is creating and executing law and order. Doing so empowers the government structure to guarantee transparency (Traunmuller and Lenk, 2000).

A service point is a place where the service mode is eventually implemented and executed. Hallowell (2002) states the connection between a service delivery and strategy creates "virtuous cycle", which in this context is a cycle of customer loyalty. Easy of navigation is the capability of businesses, customers, and government bodies to browse a website. Publicising data involves transmitting accurate, relevant, and updated information to browsers. Online support offered to web navigators ranges from email to live chat. Service delivery ranges from the ability to complete online forms to receiving email confirmations. Lastly, customers' loyalty is their overall experience online and how this experience influences their use of e-Government in the future. Soliman and Affisco (2006) articulated the (EGEC) "e-Government Experience Cycle". They discuss the benefits of e-Government (see Figure 3.4).

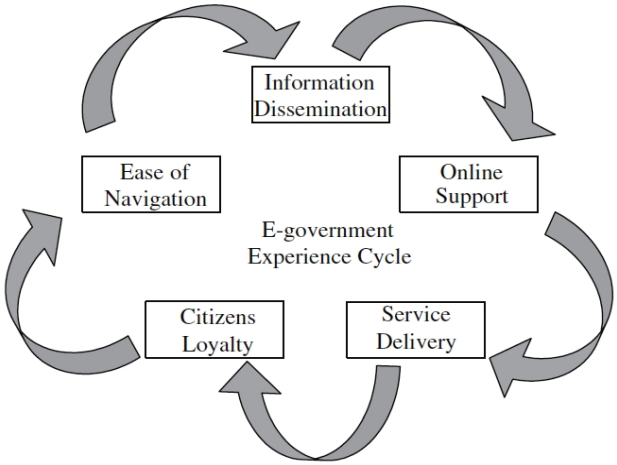


Figure 3. 4: E-Government Experience Cycle (Source: Affisco and Soliman, 2006)

Ease of navigation, dissemination of information, service delivery and online support, when well considered and skilfully executed, indicate high quality service and a favourable EGEC, which increases customer loyalty. EGEC pinpoints the "domino effect". For example, good design and improved navigation can lead to lower costs of support for citizens and government which then can lead to an improved service (Gouscos *et al.,* 2001; Verginadis *et al.,* 2003). Businesses and Citizens expect to navigate around a website easily and quickly. On the other hand, poor navigation requires more support and thus costs more. Too much customer support in e-Government transactions results in two negative outcomes (Soliman and Affisco, 2006). First, customer support costs (such as training, managerial costs and direct labour) will sharply rise. Second, customers may lose trust in e-Government and return to traditional bricks-and-mortar methods to conduct business. To summarise, Montagna represents the following dimensions of e-Government performance (, 2005):

- Constant control of actions.
- Increase use of e-services.
- Indirect strength of aspects such as governance, image.
- New links and networks: alliances, communities.

The dimensions cover all aspects of e-Government performance, expectations of users and the e-Government goals. The dimensions can be assessed by effectiveness, efficiency, institutional value and strategic benefits of e-Government (Yu, 2008; Montagna, 2005), making suitable to test the present IQBP model.

3.4.5 Information Users and Participants in e-Government

Figure 3.5 below puts forward a more general assessment of e-Government partakers. Regardless what form government has, government processes and systems include and directly or indirectly affect all organisations and people (companies, government organisations, non-profit organisations, PPP, etc.). When e-Government is implemented, therefore, all the affected parties and the relations between them have to be taken into consideration.

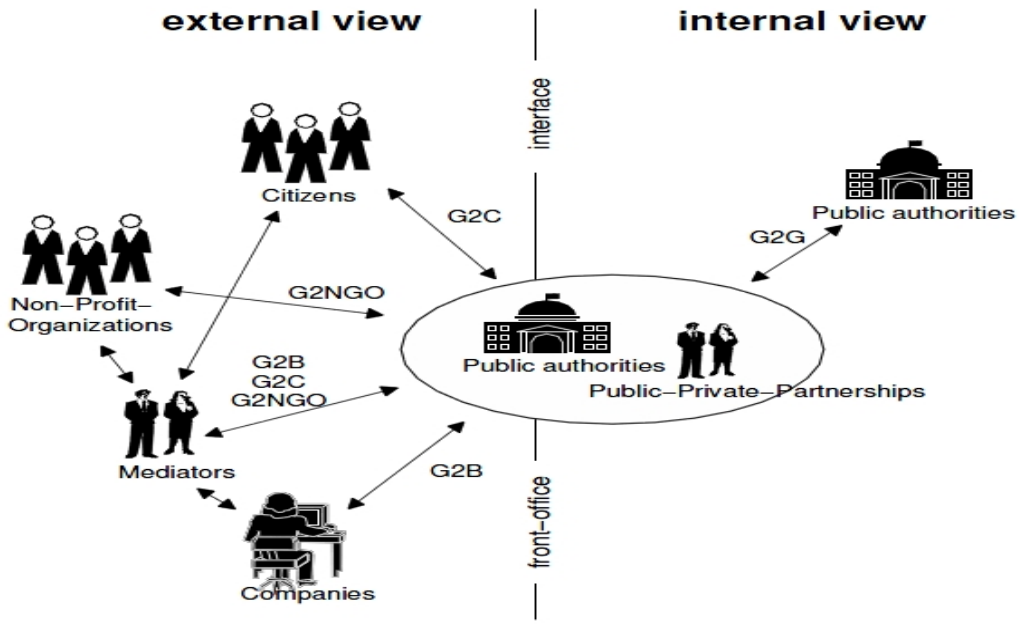


Figure 3. 5: Participants in e-Government *(Adapted: Yu,2008)*

An internal and an external view of e-Government allow basic discrepancy. Citizens, companies, mediators and NGO's are external participants, whereas public authorities and public private partnerships are internal ones. This basic grouping of participants in government procedures may not be adequate; a concise definition of the target groups could be compulsory.

By means of this clustering, Government-to-Government (G2G), Government-to-Citizen (G2C), Government-to-Non-Governmental/Non-Profit Organisation (G2N) and Government-to-Business (G2B) can be identified as types of communication which are part of a government's processes and concern all parts of e-Government (Yu, 2008). As governmental affairs cover a vast field of actions (i.e. jurisdiction, legislation, administration, etc.) several finer grained and specialised domains of e-Government can be distinguished.

Due to the close interaction and overlapping between these domains, (Yu, 2008) argues that no explicit structure has yet emerged. In a more focused view, (Scholl and Klischewski, 2007), limits the participant to collaborative project or undertaking in government including information sharing to three groups of information participant that are directly involved in the networking across technical and organisational borders:

- Administrations (the Providing Organisations) as Providers of Information and owners who organise themselves to assign roles to achieve information sharing.

- Process designers and IT developers as Information Managers and key players in integration process.

- Businesses, residents and organizations workers (the Receiving Organisations) as Information Users who press for information sharing.

Information Sharing Flow	Information Sharing Participant
Information Providers	Providing Organisations
Information Managers	IT / IS Organisations
Information Users	Receiving Organisations

Table 3.8: Information Sharing Participant Roles in e-Government

3.5 Proposed Conceptual IQBP Model and Hypotheses

Leaders and officials Government are progressively understand the potential e-Government has to improve the performance of government departments and benefit businesses and citizens, and end users in general. Adopting e-Government, however, is not a straightforward process that can be confined to a strict timetable; sharing information and quality services determine an integrated framework (Gouscos *et al.,* 2007; Ebrahim and Irani, 2005). Yet another main reason that delays e-Governments is that they require substantial changes in organisational infrastructure, which, usually engenders resistance (Ebrahim and Irani, 2005). OECD (2003) suggests that to achieve e-Government effectively and efficiently, governments ought to modernise processes and structures of public administration. There is the belief that e-Government is the innovation catalyst for the government, not merely a replacement of old practices with automated ones (Gouscos *et al.,* 2007). That's why Irani and Ebrahim (2005) propose an integrative architecture model for adopting e-Government.

The conceptual IQBP model developed in the present research will attempt to further investigate methods to improve the performance of government organisations. This research utilises a combination of the IQ/PSP model (Khan *et al.*, 2002) and the IS Success model (Delone *et al.*, 2003). The IQ/PSP model will supply the constructs of information quality dimensions used to measure the quality of information being shared between governmental organisations. The constructs are, Sound Information, Useful Information, Dependable Information, and Usable Information.

The IS success model is used to guide the strategy of theory development, that higher information quality will result in more recognised benefits in e-Government. In addition a framework developed by Montagna (2005) to evaluate e-Government initiatives is used to produce e-Government benefits, and performance constructs. With this in mind, Figure 3.6 provides the proposed conceptual IQBP model in this research.

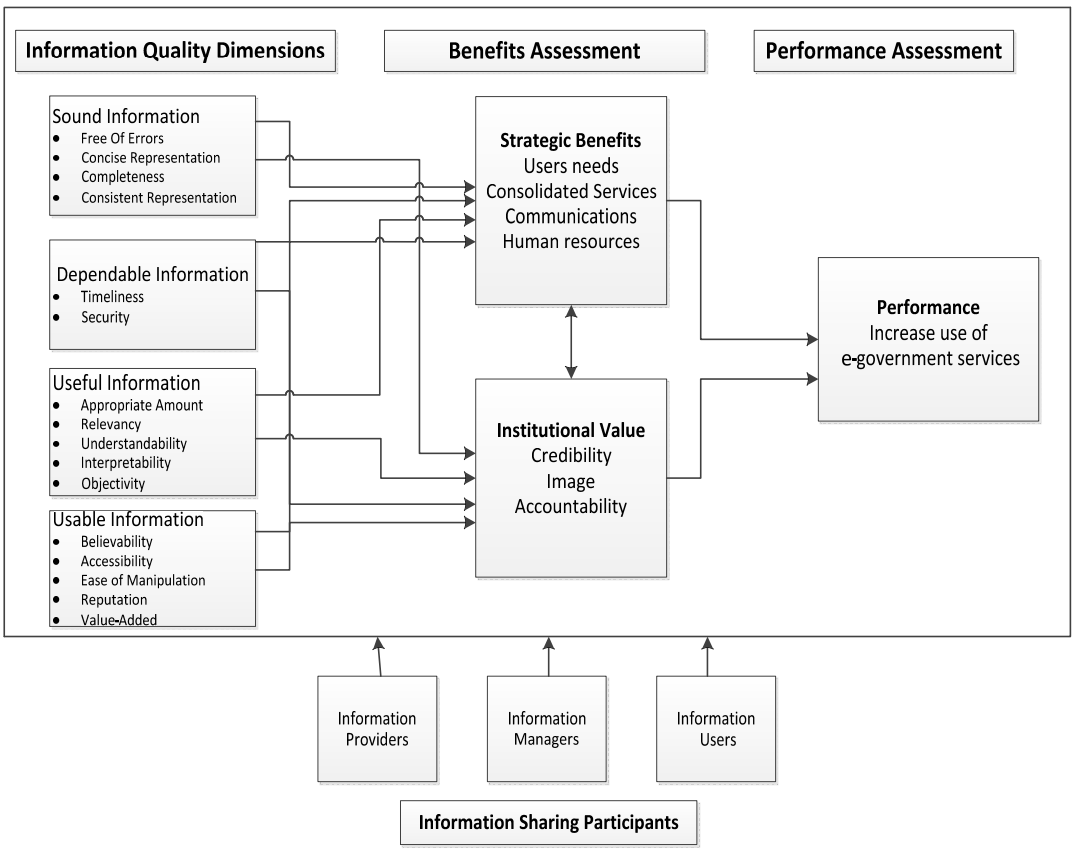


Figure 3. 6: The Research Conceptual IQBP Model

A research hypothesis is a tentative answer to a research problem expressed in the form of a clearly stated relation between independent ('cause') and dependent ('effect') variables (Punch, 2005). Hypotheses are built around a more general research problem. This thesis adopts a hypothetic-deductive and inductive approach with mixed methods, both quantitative and qualitative to conduct the present study. This study starts with the deductive approach by forming some hypotheses based on the literature review. These hypotheses are then tested by suitable statistical tests in order to be validated. Quantitative and qualitative methods were then utilised to empirically validate the conceptual framework developed in this chapter.

Evidence in the literature establishing the relationship between the management of information quality and e-Government strategic benefits has to this point been limited and sparse, with much of that evidence being anecdotal. A conceptual model was proposed for investigating this relationship. Hypotheses based on this model are discussed in this section. The strategic benefits in this case included quick reactions to users' needs, consolidated services and new communication channels (Montagna, 2005). It was hypothesized that improvements in various aspects of the information quality positively affect the strategic benefits. Accurate, relevant and timely information helps an organisation to respond to changes in its user environment. Information which is relevant, timely and accessible across organisational units can assist in aligning the organisation's information systems with its objectives. User data which is free of errors can help an organisation to improve its relationships with users.

Information Quality Dimensions on Benefits

- ***Hypothesis 1:*** Improvements in the soundness of information will be associated with increased strategic benefits.

  It is opined that the lack of relevant, complete, accurate, and timely information may be the single biggest hindrance to developing successful e-Government with the benefits enjoyed by the end users (Redman, 1995). Soundness of information is measured in terms of accuracy, completeness. It is therefore assumed that improved soundness of information ensuring the conformity of information to specifications will enhance the achievement of increased strategic benefits.

- ***Hypothesis 2:*** Improvements in the soundness of information will be associated with increased institutional value.

Soundness of information is also argued to meet the goals of transparency and accountability which are desirable institutional values through access to up-to-date, accurate and complete information. It is therefore assumed that the more information from the government websites/services are complete, up-to-date and accurate, the more transparent the government becomes and the more trust the citizens have for the government.

- ***Hypothesis 3:*** Improvements in the dependability of information will be associated with increased strategic benefits.

Dependability of information representing service quality and conformity to specification is required to certify the quality of service that guarantees benefits of e-Government. Dependability of information considers the delivery of information as a service measured in terms of timeliness and security, delivering information as at when needed and delivered intact and unfiltered by unauthorised people. It is therefore assumed that information delivered on time and secured will increase strategic benefits.

- ***Hypothesis 4:*** Improvements in the dependability of information will be associated with increased institutional value.

Dependability of information as a service quality measuring the timeliness and security of delivered information to the end-users is assumed to show the transparency of the government which adds to their institutional value. It is therefore assumed that as the dependability of information increases, institutional value is gained.

- ***Hypothesis 5:*** Improvements in the usefulness of information will be associated with increased strategic benefits.

Usefulness of information measured in terms of relevancy, appropriateness and interpretability shows how relevant and useful the information obtained from government services are to the consumer's tasks and needs. It is therefore assumed that if the high quality service/information from the e-Government enhances and facilitates the task of the end-users, the goals of the e-Government strategic benefits will be achieved.

- ***Hypothesis 6:*** Improvements in the usefulness of information will be associated with increased institutional value.

  Institutional value is described to be represented by greater credibility in institutions and improvement of institutional image which form the main focus of e-Government initiatives as efforts are made to provide useful information without stress easily interpreted and relevant to user's tasks. It is therefore assumed that government's efforts to provide useful information to citizens and businesses that will enhance their tasks, will improve the government's image and credibility.

- ***Hypothesis 7:*** Improvements in the usability of information will be associated with increased strategic benefits.

  Usability of information is measured in terms of how information services from the government websites can easily and conveniently be acquired and tailored to meet the consumer's needs and expectations. It is therefore assumed that as information services are acquired and used to meet the expectations of the consumers, the strategic benefits of the e-Government initiatives are achieved.

- ***Hypothesis 8:*** Improvements in the usability of information will be associated with increased institutional value.

  Usability of information is based on believability, accessibility, ease of operation and the reputation of information. These factors also show the characteristics of the image and reputation of the government. It is therefore assumed that as users find government information accessible, believe in the information and find the information reputable, the trust and confidence of the people on the government increases which also increases the image and credibility of the government.

Information Sharing Partners' View/Impact of Information Quality

- ***Hypothesis 9:*** There are differences among information sharing participants in respect to their view for the association between information quality and Strategic Benefits.

The views of the different information sharing participants on information quality affect their information sharing initiatives, the process and contributions which subsequently affect information quality and strategic benefits.

- ***Hypothesis 10:*** There are differences among information sharing participants in respect to their view for the association between information quality and Institutional Value.

  The views of the different information sharing participants on information quality affect their information sharing initiatives, the process and contributions which subsequently affect information quality and institutional value.

Benefits on Performance

- ***Hypothesis 11:*** Increased strategic benefits associated positively with improved performance.

  E-Government strategic benefits are focused on delivering consolidated services and new regularly monitored innovative e-Services to improve performances of the government. It is therefore assumed that meeting the strategic benefits will increase the performance of government departments and the businesses.

- ***Hypothesis 12:*** Increased Institutional value associated positively with improved performance.

  Institutional value is associated with greater credibility in institutions and encouraging active participation in all government actions which together affect performance. It is therefore assumed that as government makes effort to increase institutional value, performance of the government will also increase.

The three groups of hypotheses test the relationships between the variables and sub-variables. Hypotheses 1-8 are used to examine the relations between the dimensions of IQ and the benefits of e-Government in terms of institutional value and strategic benefits. Hypotheses 9-10 are used to examine the relationships between participants of information sharing (their impact on IQ) and benefits in terms of institutional value and strategic benefits. Hypothesis 11-12 are used to examine the relations between institutional benefits and strategic benefits, with performance. The IQ dimensions have been proven in previous studies to affect e-Government organizational benefits. Therefore, the links between information quality dimensions and strategic benefits of e-Government are independently evaluated and tested.

3.6 Summary

This chapter attempted to illustrate the challenges as well as the benefits of enhanced information quality (IQ) reacted to government organisations making use of theoretical literature from the standpoints of IQ and benefits of e-Government. It sums the discussion up by providing the model that maps the conceivable relations between IQ and e-Government benefits. IQBP model offers the main framework for the empirical study to be conducted in this research in order to explore and examine the dynamics influencing IQ and e-Government in the State Kuwait. The research constructs the model based on four IQ variables: usefulness, usability, soundness, and dependability, and three benefit variables: organisational performance, strategic benefits, and institutional value. The model proposed can be used by government institutions as a reference to improve their performance. It, further, serves as a tool for decision-making to bolster government organisations to implement IQ improvement initiatives. The model can be used by e-Government scholars and researchers to understand and analyse IQ in e-Government. Next chapters will exploit the proposed IQBP model as a foundation for empirically extensive investigation.

Chapter 4: Research Methodology

4.1 Introduction

Chapter three presented a conceptual framework which identified the independent and dependent variables with the associated hypotheses. In addition, the framework determined the nature of the study needed for the choice of methodology. Research methodology explores how knowledge about the world is acquired, the research process and the fundamental epistemological and ontological assumptions. Methodology outlines action plans from the onset of the research in the form of research questions and then their answers in the form of discussions and conclusions (Yin, 2003). There are, therefore, various research methods meaning some approaches might suit particular research type but not the other. Qualitative and quantitative methods are the two most common each approaches with different assumptions. This classification focuses on three issues: the traits of the research methodology, the study object and how it is perceived, and the knowledge and how acquired and analysed (Hennink *et al.,* 2011).

The nature of the research as determined by the objectives, the underlying ontological and epistemological assumptions, along with a suitable research methodology will be selected and justified in this chapter. This chapter, based on the conceptual IQBP model, examines the appropriate methods, presents issues related to them, and defends the research strategy and the action plan from the questions (start) to a set of answers (finish) (Yin, 2003). The methodology and research procedures include the nature of the research and its questions, the basic epistemological and ontological assumptions of the strategy to answer the research questions, research design, methods for data collection and data analysis.

The chapter commences by providing definitions and explanations for the key terms used in this chapter. This is followed by describing the research approach/design and methods, data collection and analysis. Development of the research instrument is described, including the outcome from the pilot study. The research instrument, the interviews and questionnaire were developed to verify the conceptual model and the sample population of this study is also

presented and discussed in this section. Finally, the chapter concludes by an explanation of the diverse statistical tools and techniques used in the analysis.

4.2 Terms Definitions

This chapter uses many terms such as methodology, paradigm, method technique and approach, which are open to different interpretations. In order to limit confusion, specific interpretations of these terms are adopted. This section introduces these interpretations. Mingers (2001) defines as a set of assumptions, to direct the activities of the research process. Hevner *et al.,* (2004) classified research paradigms in Information Systems into two: design science and behavioural science. They believe that the design science creates artifacts to solve problems; however, the behavioural science tries to develop theories explaining or predicting human and organisational behaviour. Based on that, the present study can be classified under the behavioural science paradigm.

Research methodology encompasses the procedures that are necessary to conduct a research study. This process includes components like: stages, methods, activities, tools and techniques. While it is important to point out that there is a mix of misunderstanding of methods and methodologies. Mingers (2001) distinguished between methods and methodologies by suggesting three usages of the term methodology: firstly, the general usage refers to the study of methods; secondly, the specific usage is used when describing the methodological procedures of a specific research; thirdly usage is the generalization of the second one. This generalization includes all the rules and norms employed in a particular field of study. The second meaning is used in this study as the term methodology is used to describe the processes adopted to conduct this research. Methodology is more general than a method because it usually contains several methods (Mingers, 2001).

Techniques and methods are employed here and often used interchangeably to perform tasks as part of other methodology processes. Mingers (2001) termed techniques as well-defined structures of operations that when executed competently yield desirable results. However, to reinforce the value as well as relevance of this research and its results, this study is concerned with combining multiple research methods.

Methods, techniques and approaches sometimes are used interchangeably to execute tasks within the procedures of the methodology. The present research adopts Mingers's (2001) definition which defines methods and techniques as well-defined sequences of operations performed to achieve predictable results. As presented in Section 3.5, the present study

utilises mixed methods, quantitative and qualitative in order to strengthen the value and significance of the research outcomes. The following section describes the detailed process followed to conduct the present study.

4.3 Research Design

This thesis uses a deductive approach with mixed methods, both quantitative and qualitative. The research design follows the enquiries most closely related to research problem (Hyman and Yang, 2001; Sila and Ebrahimpour, 2002) including considering the following:

- Process of attaining information;
- Researcher skills and expertise;
- Time and resources available for the research; and
- Cost factors related to the research, that is, the availability of funding.

Later sections discuss the relevant context of the research design that has been chosen in this study, along with its rationale.

4.3.1 Selection of a Suitable Research Approach

Because Information System is multi-disciplinary science and many of its facets are related to specialized fields, it is a difficult task to determine the most proper approach (Land, 1992). Additionally, there is not any framework that contains all the areas required for the study of IS (Galliers, 1992). Literature of information quality shows that a number of paradigms can work together. Research on IF and IQ involves many paradigms and includes a wide array of approaches, depending on what questions and perspectives being researched. For information quality as a field, flexibly utilizing several methodologies is advantageous. This is what Greene et al., (2005) called the "pragmatic stance", and described as "an inclusive philosophical framework within which multiple assumptions and diverse methods can comfortably reside" (p. 275).

Furthermore, understanding the rational assumptions underlying appropriate approaches develops clear understanding that facilitates the selection of research approachs (e.g. qualitative, quantitative, or mixed) for a particular research (e.g. examining strategic benefits and e-Government Information quality). Lincoln and Guba (1994) suggested four core "paradigms": (a) critical theory; (b) positivism (or scientific) (c) constructivism (or interpretivism) and, (d) post-positivism. These approaches fundamentally depend on

dissimilar assumptions and dictate different approaches. Myers (1997) also reports that despite being distinct, distinctions of these research epistemologies are not always specific especially in humanities.

There is an intense debate as to whether such research epistemologies are necessarily very different from each other and whether they can be used together in one research (Myers, 1997). Most importantly, positivism has remained the prevailing epistemology in Information Systems research (Yin, 1994; Miles and Huberman, 1994). Baroudi and Orlikowski (1991) state that IS can be considered a positivist field if evidence of measurable variables, hypothesis testing, formal propositions, and drawing of inferences are founded. Table 4.1 provides the justification behind selecting the positivists approach in this research as the categorisation adapted from Orlikowski and Baroudi (1991). Galliers (1992) adds that positivism means that observations of phenomenon can be made accurately and objectively. In a word, positivism as an approach rose from scientific research and is categorised by refutability and repeatability.

Positivists Evidence	Present Research Applicability
Formal Propositions	Literature review maintained defined propositions of the relationship between information quality and strategic benefits.
Quantifiable Variables	• Independent Variables (16 information quality dimensions). • Dependent Variables (16 e-Government strategic Benefits).
Hypothesis Testing	Developed to test relationship among independent and dependent variables.
Generalisation	Probability sample randomly selected from government employees as target population.

Table 4.1: Justification for Selecting the Positivists Approach *(Adapted: Orlikowski and Baroudi, 1991)*

The key scientific methods of research are inductive and deductive and the hypothetic-deductive methods. The hypothetic-deductive studies start with a theoretical model, forming hypotheses and rationally inferring conclusions from the analysis results. Deductive and inductive research theories assist scholars to comprehend, elucidate, or anticipate phenomena (Sekaran, 2000). The essential question is to what extent the researcher is confident about the theory or methodology he or she is employing as they start their research. The deductive approach means the research has to develop a theory and related hypotheses, and develops a research plan to test these hypotheses (like in this research). The inductive method means the researcher has to collect data and develop a theory or a framework due to the ensuing analysis (Saunders *et al.,* 2009).

The deductive method follows existing theories on the same subject and thereby creates a basis for the study. Here, researchers design questions for collecting empirical data. The use

of these questions in the form of a questionnaire survey allows empirical data to be collected. The results obtained from the empirical data are further analysed in the light of the current knowledge in the literature in order to draw conclusions (Hyde, 2000). Saunders *et al.,* (2009) found the following features in deductive research:

- Scientific principles.
- Shift from theory to data.
- Explanation of causal relationships among variables.
- Collection of quantitative data.
- Application of controls in order to ensure data validity.
- Concept operationalisation to ensure clarification.
- Highly-structured approach.
- Researcher remains independent of research.
- Selection of enough samples to generalise conclusions.

In an inductive approach, general conclusions can be drawn from the empirical findings. This kind of method is commonly used when there are very few established theories in the area of research (Hyde, 2000), unlike the research in hand. According to Saunders *et al.,* (2009), inductive research has the following features:

- Analysing qualitative data.
- Flexible structure to allow redirect research focus while it is running.
- The researcher is a key part of the process of the research.
- Less attention to generalise.

Deductive research, then, starts from theory and moves towards empirical data, as the present research does, Inductive approach, conversely, starts with empirical data and moves towards theoretical literature to build up a theory. Once the theory has been formed, the researcher may again follow a deductive approach to validate the theory, or not. Based on the above discussions, the current research opts for the deductive approach forming the hypotheses on the basis of the literature review, above. The research hypotheses are then investigated by appropriate statistical tools in order to be validated. Mixed method approach was used in this research. Qualitative and quantitative methods were used to empirically evaluate the conceptual model proposed in Chapter three. The following section describes the benefits from utilising such approach.

4.3.2 Justifying the Use of Mixed Research Method

The mixed approach method since the author utilised quantitative data reinforced by qualitative data. Quantitative data are normally focused on the problem under investigation (Bell and Bryman, 2007). The research still formulated a strategy to highlight quantifiable data collection techniques and adopted a deductive method to incorporate positivism in order to view social realism as an objective and independent reality. On the order hand, Qualitative methods stress descriptions instead of quantification in collecting and analysing data that mostly emphasize an inductive method to establish the links between research and theory.

Table 4.2 lists the key phases of the methodology of this research. This section starts with information quality theories, and in specific the use of the (PSP/IQ) model that categorises information quality dimensions into four quadrants (Soundness, Usefulness, Usability, and Dependability). E-Government theories were also studied, more specifically the assessment models such as proposed by Montagna (2005). From those models, some hypotheses were proposed as discussed in Chapter 3.

Main Phase	Intervening process
Theory – Hypothesis	Deductive
Hypothesis – Interview / Questionnaires	Operationalisation
Interviews / Questionnaires – Data Analysis	Data Processing
Data Analysis – Findings	Interpretations
Findings – Return to Theory	Inductive

Table 4.2: The main phases of our research *(Adapted: Bryman, 1995)*

The process of translating concepts (e.g. soundness of information) into working definitions is called operationalization, which pays significant attention toward validity and reliability. Employing mixed methods in this thesis has two considerable advantages. Firstly, different purposes of research require different methods, for example, carrying interviews prior to the pilot study to obtain feedback on the survey instruments. Doing that instils confidence into the researcher that the research is original and focuses merely on significant issues (Saunders. *et al.,* 2009, p-146). Secondly, using multiple methods makes triangulation possible to happen. In humanities, triangulation refers to the notion that relating outcomes from different research methods and techniques enables the researcher to understand if a variable has been precisely measured and controlled (Moran-Ellis, J et *al.,* 2006).

Patton (2002) proposed four triangulation types: (a) evaluating data by different research methods (e.g., qualitative and quantitative); (b) measuring data from different quantitative and qualitative sources; (c) using various procedures of analysis; and (d) investigating data from

varied theoretical angles. The final phase in this study includes deriving pertinent findings, leading to induction that involves moving forth and back between data and theory (Bell and Bryman, 2007).

4.4 Research Hypothesis

A hypothesis in research is a proposed answer to a research problem articulated in plainly stating the relationship between independent ('cause') and dependent ('effect') variables. Usually hypotheses are based on a broader research problem. According to Siniscalco and Auriat (2005), a working research hypothesis should

- Describe openly and identify the most essential variables in operational terms.
- Identify expected links between control, dependent and independent variables.
- Exclude the biases and subjectivity of the researcher.

There has been only very limited research conducted the relations between information management quality and e-Government benefits and institutional value. A research framework was suggested to investigate and examine this connection. Below is a discussion of the hypotheses based on this model. Fast reactions to customers' needs, new communication channels and joined services are the strategic benefits in this research context (Montagna, 2005). Improvements in any part of the information quality influence the strategic benefits positively. Accurate, timely and relevant information assists an organization to adapt to its user situation (Redman, 1996) and can help organizations align their objectives and its information systems (Liu and Chi, 2002). Free of error user data helps an organization enhances its relationships with customers (Bovee *et al.,* 2001).

The first four hypotheses below address the relationship between information quality quadrants from the PSP/IQ model and strategic benefits. The second four hypotheses address the relationship between information quality quadrants from the PSP/IQ model and institutional value. The 9th and 10th hypothesis address the dissimilarities among information sharing participants in their view for the correlation between information quality and strategic benefits and institutional value. The 11th and 12th hypotheses deal with the relationship between strategic benefits and institutional value and organizational performance within the e-Government environment.

- ***H1:*** *Improvements in the soundness of information will be associated with increased strategic benefits.*
- ***H2:*** *Improvements in the dependability of information will be associated with increased strategic benefits.*
- ***H3:*** *Improvements in the usefulness of information will be associated with increased strategic benefits.*
- ***H4:*** *Improvements in the usability of information will be associated with increased strategic benefits.*
- ***H5:*** *Improvements in the soundness of information will be associated with increased institutional value.*
- ***H6:*** *Improvements in the dependability of information will be associated with increased institutional value.*
- ***H7:*** *Improvements in the usefulness of information will be associated with increased institutional value.*
- ***H8:*** *Improvements in the usability of information will be associated with increased institutional value.*
- ***H9:*** *There are differences among information sharing participants in respect to their view for the association between information quality and Strategic Benefits.*
- ***H10:*** *There are differences among information sharing participants in respect to their view for the association between information quality and Institutional Value.*
- ***H11:*** *Increased strategic benefits associated positively with improved performance.*
- ***H12:*** *Increased Institutional value associated positively with improved performance.*

4.5 Data Collection

Data can be collected in various ways, which differ in terms of time, cost and the other resources at the researcher's disposal. Primary data can be collected by experiment or survey. If the researcher opts for experiments, he/she must examine the resulting quantitative modes of measurement or other data, depending on the research problem and objectives (Bowling, 2005). Surveys can take the forms of observation, personal interview, telephone interviews, and by mail questionnaires (Saunders *et al.,* 2009). This section explains the procedures of collecting the research data. This thesis starts by collecting quantitative data in the form of survey questionnaire with close-ended questions – this was undertaken to collect relevant data for current study. The questionnaire has been discussed in later sections, in detail. Furthermore, qualitative data were collected through interviews of selected managers and employees representing all types of participants (information providers, information managers, and information users).

Data of this research were collected by using two methods. First, through a hand delivered questioner by the researcher's selected representatives, and secondly, through a semi-structured interviews. Participants identified in the sample are all positioned in the Kuwait government ministries. They were asked to participate via e-mails, personal visits, and internal memos. Participants decided not to participate in the investigation were given copies of the survey to complete. Completed surveys delivered to a specified box closely located to the participants. Boxes then were collected by representatives of the author and delivered to the author. Those participants who decided to participate in the managers and employees interviews agreed to an interview schedule with the author. Complete interviews were recorded electronically, and saved only in the author's personal computer.

It is worth noting that access to the collected data was available only to the researcher. Data then were converted from survey results to the form of an Excel spread sheet, and interviews recordings were transformed into AVI format and then saved to the author's PC (QuestionPro *et al.*, 2006). The author's pc was safeguarded against any unauthorised access through multiple security procedures, including software firewalls and hardware. The data was backed up onto a compact disk and was stored in secure facility. The data will be saved for at least 7 years after finishing this research.

The survey and interviews were carried out according to the procedures set by Brunel University. The participants were approached non-coercively with a kind invitation and then followed by a reminder. The participants were informed about the research: the expected time of commitment, any risks of participation, and the fact that involving in this research is totally voluntary and that they can stop at any time. Participants, whose personal information will remain confidential, were not paid for their efforts and participation.

4.5.1 Questionnaire

A questionnaire is a tool used to collect where the interviewer is not required to respond to the respondents while they are completing the questionnaire (Brace, 2004). The questionnaire is the basic and most popular research instrument in quantitative studies. A questionnaire is structured around sets of questions and distributed to the target group of the study. Respondents are expected to answer according to their interpretations and opinions related. Questionnaires can be either structured or unstructured; the former has multiple choices, a scale questions; whereas, the latter is open-ended where the respondents can use their own words (Malhotra, 2004).

Still, one questionnaire can both types of questions. Questionnaires can easily be administered amongst a diverse sample study (Moustakas, 1994). The advantages of questionnaires include:

- They are better score over the other survey methods.
- They are cheaper to conduct and do not depend upon the researcher being present.
- Collate data from questionnaire is very easy easier since the answers have a similar structure.

Despite these advantages the structure of questionnaire still has drawbacks. First of all, the common format of answers can be both confusing and displeasing. Second, when respondents cannot understand a question, their answers are undermined and this could make the whole data collection process inaccurate and futile. However, participant in the present research were given essential information to explain research goals, and objectives. In the present research, a three-part questionnaire was designed, asking closed-ended questions. First, it identified participants' roles, so as to understand their views on sharing information. Data were collected from 3 different kinds of participants, namely, Information manager, Information provider and Information user. A standard questionnaire was compiled in order to compare the responses of these three kinds.

As the respondents ticked their choices to indicate different types of interaction, the data were built up. For information providers, the choices were offered, providing information to others, updating, and modifying information. For information users, the approach was to look up information; receive reports; obtain services and finally monitor service status. Information managers had options such as design/deploy, manage, and operate information systems. The questions included the topics of strategic benefits and institutional value. In addition, the process of gaining value from information (see Table 4.3). The quality of the shared information comprises its usefulness, soundness, usability and dependability. All the questions were designed for a 5-point scale, ranging from 1, indicating 'strongly disagree' to 5, representing 'strongly agree', with point 3 pointing to 'neutral' status. 16 questions were asked on the strategic benefits, institutional value, and performance gained from the use of information.

The third part of the questionnaire concerned information quality (see Table 4.4). It presented 33 statements opposite another 5-point scale and asked respondents to indicate how far they agreed with them. The measurements were the same as for part two, but the points on the scale were different. Point 1 was labelled "Not at all" and point 5 as "Completely agree", point 3 representing "average". Statements were measured for information usefulness, soundness, usability and dependability.

Variables	Questions
Strategic Benefits	• Quickly reacts to my needs. • Allows consolidated services. • Provides new communication and operation channels. • Generates new links and networks: alliances, communities, etc. • Improves knowledge of users' needs. • Encourages the development of human resources. • Provide constant control of actions.
Institutional Value	• Helps to create closer relationships between partners. • Enables greater credibility in institution. • Improves institutional image. • Enhances inspection of public services. • Allows more active participation in all government actions.
Performance	• Increases use of e-Services. • Allows creation of new and innovative e-Services • Provides indirect strength of such aspects as governance, image, etc • Available Information 24x7.

Table 4.3: Classification of the Variables Studied – Strategic Benefits, Institutional Value, Performance from Information Use (*Adapted*: Montagna (2005))

Variables	IQ Dimensions	Questions
Sound Information	• Completeness • Free Of Errors • Concise Representation • Consistent Representation	• This information is sufficiently complete for our needs. • This information is accurate. • This information covers the needs of our tasks. • This information is presented concisely. • This information is presented consistently • This information is consistently presented in the same format. • The representation of this information is compact and concise.
Useful Information	• Appropriated Amount • Relevancy • Understandability • Interpretability • Objectivity	• This information is of sufficient volume for our needs. • The implications of this information are difficult to understand. • The measurement units for this information are clear. • The amount of information is neither too much nor too little. • This information is appropriate for our work. • This information is applicable to our work. • This information is easily accessible. • It is easy to interpret what this information means. • This information presents an impartial view. • This information is easy to understand.
Dependable Information	• Timeliness • Security	• This information can be accessed by qualified people only. • This information is quickly accessible when needed. • This information is sufficiently up-to-date for our work. • This information is sufficiently current for our work. • This information is not protected with adequate security. • This information is not sufficiently timely.
Usable Information	• Believability • Accessibility • Ease Of Manipulation • Reputation • Value Added	• This information is believable. • This information is based on facts. • This information is trustworthy. • This information is reliable. • This information is easy to manipulate to meet our needs. • This information is easy to combine with other information. • This information has a poor reputation for quality. • This information comes from good sources. • This information provides a major benefit to our work. • This information adds value to our tasks.

Table 4.4: Classification of the Variables Studied under Information Quality Assessment (*Adapted*: Slone (2006))

4.5.2 Interviews

In order to conduct interviews, one or mix of three types of interviews can be used: highly structured, unstructured or semi-structured. In a structured interview, interviewers ask each participant the same set of questions in the same manner, very much a written questionnaire or exam. Questions may be phrased in a way to produce a limited range of response. For example, "Do you think that the information quality in your organisation is excellent, good, average or poor?" taking into account the fact that interview can be costly, a researcher should sensibly consider if the data can collected via a questionnaire. In the present research, the triangulation approach necessitated using several data sets through data collection from different public-sector administrations. First, the researcher carried out three in-depth interviews after developing the final format of the questionnaire and before the pilot study commenced. Interviews aimed to ensure the meaning of the concepts under investigation was correctly perceived. The interviews provided a validity check on the purposefulness of the strategic benefits, transparency, and institutional value.

Although the questionnaire provides adequate data, 31 unstructured-interviews were carried out after the data was analysed to confirm the data obtained from the questionnaire. Essentially, having unstructured or semi-structured interview questions often leads to a greater degree of confidentiality because the interviewees replies tend to be more personal (Easterby-Smith *et al.,* 2008). The semi-structured interviews are informal where the interviewee talks spontaneously and freely about experience, strategy and quality and relate it to what they think will improve levels of information quality. Interviews are conducted face-to-face, administered persoanlly and directly by the researcher. Interviews are conducted with government management employees from different organisations that perform the roles of Information Providers, Information Managers, and Information Users, as shown in Table 4.5. Information systems used by the participants range from web portals, which enable public to participate in local governance activates, payments gateways, which provide alternative channels to pay for the governmental services, to static websites, which provide basic services and information for citizens.

Organisations Role	Interviewees No.
Information Provider	10
Information Manager	7
Information User	14

Table 4.5: Interviewee Distribution

An example of interview's weaknesses is that a poorly constructed interview can create bias in the interviewee's answers (Yin, 2003), as shown in Table 4.6. To overcome this weakness, interviews were constructed, and questions were prepared, only after the survey results were analysed. Another example of weakness was highlighted by (Denscombe, 2007) is reflexivity, where the interviewee answers the content that interviewer wants to hear. In the interviews conducted with managers (as part of this thesis research), they were advised that their individual participation was totally voluntary and that they could stop at any time. Furthermore, participants were not paid for their participation.

Strengths	Weaknesses
• Targeted – directly focuses over research topic. • Insightful – offers perceived causal inferences. • Depth – interviews are as per detailed and deep data. • Equipment – no expensive equipment.	• Bias because of poorly constructed questions. • Responses are bias. • Inaccurate for poor recall. • Reflexivity – interviewee answered the content that interviewer wants to hear.

Table 4.6: Strengths & Weaknesses with Interviews in Data Collection Method *(Adapted: Yin, 2003; Denscombe, 2007)*

4.6 Variables Studied

A variable is characterised as an assumption with two/more properties. If a property is subject to a change in its quantity or in terms of its quality, then the assumption is marked as a variable. There are five main kinds of variable, as Saunders *et al.,* (2009) note:

- ***Dependent variables:*** these are the variables, which the researcher tries to illustrate.

- ***Independent/explanatory variables:*** these are the variables, which illustrate or cause relevant change under dependent variable.

- ***Control variables:*** these are the variables, which are used in general for the testing of spurious relationships between independent and dependent variables. The process is to test if the observed connection between independent and dependent variables is subject to explanation by another variable.

- ***Continuous variables:*** these are the variables, which consider all the values within a particular range.

- ***Discrete variables:*** these are variables with specific values.

This study made use of two variables: independent ones measuring different dimensions of information quality, and dependent variables measuring strategic benefits of e-Government. To facilitate grouping of responses a set of demographic variables was collected. The independent variables were used to measure information quality. These variables were operationalised at two levels: the dimension level and the PSP/IQ quadrant level. The dimension level was measured directly by using the 34 survey items from the Information Quality Assessment (IQA) instrument (Lee *et al.*, 2002; Najjar, 2002) as listed in Tables 4.5 and 4.6. This instrument employs a scale from 0 to 5, where 0 represents not at all and 5 represent completely, and the midpoint is identified with the label average. One independent variable per information quality dimension was calculated as the mean value of the response items measuring that particular dimension. The PSP/IQ quadrant level variables were each calculated as the mean value of the dimension values corresponding to that particular quadrant (Kahn *et al.*, 2002; Lee *et al.*, 2002).

The dependent variables in this study are used to measure e-Government strategic benefits, transparency, and institutional value. These variables were operationalised at two levels: the category and the dimension level. Then, the dimension level was directly measured by using 16 questioner items extracted from the e-Government assessment and analysis framework developed by Montagna (2005).

- **Independent Variables are marked as conferring:**
- *Useful Information*
- *Sound Information*
- *Usable Information*
- *Dependable Information*

- **Dependent Variables are marked as conferring:**
- *Strategic benefits*
- *Institutional value*

4.7 Design of Sample

Generally, enquiries are put to a given ‘population’ or ‘universe’. Researchers must decide on the process of selecting the population sample or the sample design. The sample design remains a definite element in the process of determining any data collected from population of the study. Samples can be either *probability* samples or *non-probability* ones. In the case of probability samples, every element carries a known probability as part of the sample, but non-

probability samples never allow this probability to be assessed. Probability samples may follow basic random sampling, systematic sampling, stratified sampling, area or cluster sampling. However, non-probability samples follow judgment sampling, convenience sampling and the process of quota sampling.

In practice, the many sampling approaches illustrated above can be used in the same study, which is then described as having mixed sampling methods. The target group for this research consisted of only government employees who habitually use at least one computer-based information to share information with other governmental organisations. This was planned to encompass the three prime roles of Information Provider, Manager, and User.

The process in the present work is that of a probability sample by simple random sampling. Equal respondents are marked in the categories of provider, user or information manager, once selected; they will receive a questionnaire by email or by hand. Initially, 450 questionnaires will be supplied for e-Government project 4 and decisions will be taken about supplying more when the number of responses is counted. Follow-ups requests to respondents will be made twice a week for 2 weeks. If less than 70% of the sent questionnaires respond, more questionnaires will be sent to elicit more responses. As the returned questionnaires reach the desired percentage, those received will add more data for analysis. Table 4.7 shows the details.

Category of Participant	**E-Government Projects**	
	Distributed	*Received*
Information from the Users	150	131
Information from the Providers	150	60
Information from the Managers	150	31

Table 4.7: Distribution of Questionnaires

In the case of large study population, choice of a representative sample is a must approach for less costly and effectively collecting data about the wider population (Cooper and Schindler 2003). Most governmental main offices are located in the ministries complex that allowed a random selection of government employees. After gaining the authorisation to survey governmental employees, the author contacted employees in the ministries complex to invite them to participate in the survey.

4.8 The Pilot Study

A pilot study is a miniature version of the actual study and is intended to check the standard of the questionnaire to be used in collecting the data. Saunders *et al.,* (2009) maintain the importance of a pilot study. It helps to refine the questions so that the respondents have no difficulty in answering them. A small group of known people are used for conducting the pilot study. This set of respondents is asked to provide feedback on the ease of understanding the questions; use and importance of the different variables, the overall design of the questionnaire and for any other comments that would make the questionnaire stronger and better ensure answers from the respondents. In other words, they assess the questionnaire to ensure its clarity, reliability and validity.

A total of 50 known respondents, most of which were chosen at random, along with senior employees to provide an expert view. They consisted of 20 employees from the Information Provider category, 15 Information Managers and 15 Information Users. Not all questionnaires were received from the employees; only 46 were completed and received. They were asked to check the comprehensibility of the language; the ease of answering the questions and any other aspects that they felt would make them easy to answer. The following changes were made on the basis of their responses.

- The questionnaire originally had a 10-point scale for all statements within the "Strategic benefits from Information Use" and "Information Quality Assessment" sections. Here some of the respondents proposed a 7-point scale but most preferred a 5-point scale. Thus a 5-point scale was used.
- The original questionnaire had 25 questions in the "Strategic benefits from Information Use" section and 42 questions in "Information Quality Assessment" section. The pilot test respondents stated that these were too many and hence they were reduced to 16 in the former and 34 in the latter.
- Demographic information was not part of the questionnaires. It was suggested during the pilot test, and some demographic questions were specifically asked for, such as participant job title and function, and then added to the questionnaire.

The information quality section (Part III) in the questionnaire, was extracted from Information IQA - Quality Assessment - instrument (Najjar, 2002; Lee *et al.,* 2002), and its variables were modified according to the requirements of this study. The strategic benefits section (Part II) in the questionnaire was extracted from the framework of assessment and analysis of e-Government proposals (Montagna, 2005). This part of the questionnaire determines the

element that support e-Government strategic views, and provide decision makers with the tools to develop e-Government projects.

This study is intended to provide the inferences, which will allow a quick reaction to needs, improve the institutional image, allow the creation of new and innovative e-services and help to create closer relationships between partners. The expected outcome from the questionnaire was the model of government specific strategy, which would allow more active participation in all government actions; enhance the inspection of public services, increase the use of e-Services and allow services consolidated. The pilot study helped the author to scrutinise the questions of the survey and to also check the quality of the questions. Though the questions were based on the variables mentioned in the literature review, however, a few of them could be rephrased or removed, in response to the suggestions from the experts who tested the pilot questions. After collecting the data through the pilot study, the questionnaire was reframed and the data was collected again from this group without confusion.

4.9 Data Analysis

Two types of quantitative and qualitative data are collected and therefore two different methods of analysis will be employed in this research.

4.9.1 Quantitative analysis

Before testing any hypothesis, it is essential to examine, screen, refine, the data to meet the underlying assumptions related to the employed statistical techniques. This section provides a description of the procedures used the investigative data analysis. First, the data were checked for any missing data, in which case it was handled in two efficiently convenient way: removing the cases or substituting values for the missing items, in case the number of missing data is small or in case it is not small, respectively (Vannatta and Mertler, 2005).

Afterwards, the data were screened to check extreme values. Cases which have extreme combinations of values are Multivariate outliers. They can be scrutinised through Mahalanobis distance procedure, which "is evaluated as a chi-square ($\chi 2$) statistic with degrees of freedom equal to the number of variables in the analysis" (Mertler and Vannatta, 2005, p. 29). Mertler and Vannatta believe that outlier cases for which the Mahalanobis distance is significant at $p < .001$ should be investigated. If the case signifies an error, it ought to be dropped promptly. If it appears legitimate, the researcher can consider whether to evaluate the results with and without such a case and can assess choices like transforming the information to lessen its impact.

Additionally, to outliers and missing data, multiple regressions use is based on three simple assumptions regarding the data: linearity, normality, and homoscedasticity. To test these assumptions, statistical and graphical examinations are included. For each hypothesis, a scatter plot matrix of the dependent variable and each independent variable were generated as a first indication. The ideal shape of each plot is an ellipse. Where the plot was not elliptical, each variable was assessed individually for normality using the Kolmorgov-Smirnov test, as well as determining the skewness and kurtosis of each variable.

To the extent these tests revealed problems, transformations such as square roots, logarithms, reflections, and inverses were considered as appropriate for the particular normality problem detected. Linearity and homoscedasticity were examined by plotting the standardized predicted values and standardized residuals against each other.

If the assumptions are met, the plot should fit a roughly rectangular pattern for linearity, and to indicate homoscedasticity, the values should be distributed fairly evenly above and below the plotted reference line. As with linearity, problems revealed through these plots were examined and, to the extent necessary, were addressed through transformations. Finally, it should be noted that while conformance to these assumptions is the ideal, some departure from the ideal was expected. Moreover, slight to moderate violations of the assumptions "merely weaken the regression analysis, but do not invalidate it" (Mertler and Vannatta, 2005, p. 174, Tabachnick and Fidell, 2013).

Each of the main effect hypotheses was analysed using stepwise multiple regression with stepwise selection. Stepwise multiple regression is considered appropriate for exploratory studies. Stepwise selection adds variables in the order of their contributions, yet tests the significance of each variable already added, removing them if it is determined that they no longer provide a significant contribution, resulting in the potential for a more parsimonious regression model. The end result of each regression is an equation of the form: $Yj = \beta 0 + \beta 1 + ... + \beta i + \varepsilon$(Equation1) where βi = a particular independent variable and Yj = an instance of a dependent variable. Each beta coefficient (β) represents the standardized weighted contribution of a particular independent variable in predicting the value of a dependent variable (Mertler and Vannatta, 2005).

Before interpreting a multiple regression equation, it is important to consider the tolerance value, which is a measure of multi-collinearity ranging from 0 to 1. Values of less than 0.1 are indicative of a multi-collinearity problem. An alternative test for multi-collinearity is the variance inflation factor, for which values greater than 10 are cause for concern. Two acceptable approaches for dealing with multi-collinearity problems are to remove one of the problem variables or to combine two problem variables into one. The latter approach is recommended when the variables have an inter-correlation of .80 or higher (Mertler and Vannatta, 2005).

The output of the regression analysis consisted of three parts: the model summary, an ANOVA table, and a set of coefficients. In the model summary, the values for multiple correlation (R), the squared multiple correlation (R2), and the adjusted squared multiple correlation (R2adj) were reviewed to assess how well the model predicted the dependent variable. In particular, R2 and its adjusted variant (R2adj) were used to assess the total contribution of the independent variables.

Both R and R2 tend to overestimate the contribution, especially with small sample sizes, in which cases R2adj is considered to be more representative of the true contribution. In addition, since this analysis used a stepwise method, the change in the value of R2 (ΔR2) was reported for each step generated (Mertler and Vannatta, 2005). The ANOVA table presented the F-test and level of significance for each step generated, reporting the degree to which the relationship was linear. A significant F-test is indicative of a linear relationship, hence a significant prediction. Finally, the set of coefficients was examined to consider the unstandardised coefficients (B), the standardised coefficients (β), the t values, significance values, and a set of correlation indices (Mertler and Vannatta, 2005).

4.9.2 Qualitative Analysis

There are different types of qualitative data analysis have been used across various areas of research. The two most popular types of qualitative data analysis are content and thematic analysis (Braun and Clarke, 2006). They are both used to develop a framework for describing and organising qualitative data (Patton 2002). In this research, the thematic analysis was used to analyse the qualitative data. Thematic analysis includes organising principles within data into themes according to their similarities (Braunand Clarke, 2006). There are a variety of steps and phases used to perform thematic analysis (Attride-Stirling, 2001; Braun and Clarke, 2006). For the purpose of this research, four steps were applied following those of Braun and Clarke (2006).

- Getting familiar with data.
- Generating initial codes and themes.
- Searching for themes.
- Reviewing codes and developing analytical themes.

Getting Familiar with Data

This section provides some background about the interviewees including: gender, age, information sharing rule and occupation. Three e-Government agencies (A1, A2 and

A3) were selected to conduct interviews. To ensure a representative sample, the author collected qualitative data by conducting interviews with 31 participants. The participants' characteristics were quite similar between qualitative and quantitative data (see Section 5.2). Table 4.8 presents a summary for the demographic characteristics and the profiles of the interviewees.

Demographic Characteristics	Description
Average Age	• **A1**: 30 years • **A2:** 27 years • **A3:** 33 years
Gender	• **A1:** Male 6, Female 4 • **A2:** Male 6, Female 5 • **A3:** Male 7, Female 4
Educational level	• **A1:** High School & below 2, Diploma 3, Bachelor 3, Higher Education 2 • **A2:** High School & below 2, Diploma 4, Bachelor 4, Higher Education 1 • **A3:** High School & below 2, Diploma 3, Bachelor 3, Higher Education 3
Information Sharing Rule	• **A1:** Users 4, Providers 3, Managers 3 • **A2:** Users 3, Providers 4, Managers 4 • **A3:** Users 4, Providers 3, Managers 4
Occupation	• **A1:** Employee 4, Section Head 4, Manager 2, Director or above 0 • **A2:** Employee 3, Section Head 1, Manager 2, Director or above 1 • **A3:** Employee 4, Section Head 3, Manager 2, Director or above 2

Table 4.8: Information on Demographic Characteristics and Profiles of the Interviewees

Table 4.8 summarises the characteristics of interviewees including:

- *Average age* is about 30 years.
- *Gender* is predominantly male (19 Male, 13 Female).
- *Educational* level varies from no High school and below to Higher education.
- *Information sharing role* includes three roles: User, Provider and Manager.
- *Occupation* includes four levels: Employee, Section Head, Manager and Director.

Generating Initial Codes and Themes

There are two methods that can be used to generate codes and themes, manual and computer-assisted methods. In this thesis, the manual method was used as it allows more flexibility and also makes it easier to get the big picture from the data. To generate the codes, different

colour highlighters and multiple folders were used. In addition, multiple readings of the transcripts were undertaken to allow the development of principles and constructs regarding potential codes. In line with the "Hybrid Model" of Fereday and Muir-Cochrane (2006), this research combined both the deductive and inductive approach to extract and generate codes and themes.

- Initially, deductive approach was adopted where the codes emerge from the literature and then these codes were used to develop the questionnaire.

- Later, inductive approach was used to allow themes and to emerge from the interview data (Patton, 1990).

The code's list is not divided according to the e-Government agencies covered in this research; rather, the codes were divided into groups corresponding with the constructs investigated in this research. As this research used thematic analysis instead of content analysis, the number of times that a code appears in the text is not important (Buetow, 2010). The next section presents the results of searching for themes and codes, through interview quotes, to gather interview-based codes. The combined codes from both the questionnaire and the interviews are aggregated into groups (Table 4.9).

Searching for Themes

This section discusses some of the research findings derived from the analysis of the interview data. These findings emerged from the process of reading and reviewing of text segments, correlating the collected codes with the constructs and the variables covered in this research. The collected codes were grouped into sub-themes and themes according to the relationships between the variables, which have been identified in the quantitative analysis. The extracted themes, codes and sub-themes are as follows:

Themes	Sub-themes	Codes
Information Quality	Sound Information	• Accuracy • Completeness
	Useful Information	• Objectivity • Interpretability • Relevancy
	Dependable Information	• Timeliness • Security
	Usable Information	• Accessibility • Value added • Believability

Strategic Benefits	Costs	• Costs savings • Time and efforts
	Decision Making	• Agility and efficiency • Empowerment
	Service Quality	• New and Innovative e-Services
Institutional Values	Credibility	• Transparency • Accountability
	Institutional Image	• Responsibility
Organisational Performance	Service Availability	• Goals achievement
	New Links, Alliances, Communities	• Wider participation

Table 4.9: List of themes, sub-themes and codes

4.10 Summary

In this chapter, the researcher presented the research methods and approaches to demonstrate the stages used in the data analysis. A positivist philosophical approach was used in the present research. This study adopts a mixed method approach, quantitative and qualitative methodologies. A survey questionnaire consisting of five-point Likert scales was used. Items were adopted from previous research to make sure content is valid. The items of the questionnaire were enhanced in all their stages and then they were translated from English into Arabic and back-translated before the pilot study; the Brislin back-translation technique was used (Brislin, 1980). The scales were translated from Arabic into English and then English into Arabic by several professional translators. The author explored many approaches and strategies to overcome any error in translation. A pilot study, furthermore, was conducted in the State of Kuwait with several interviews to finalise the final format of the questionnaire.

The study's population is drawn from governmental employees that use existing information systems. Furthermore, face-to-face interviews were performed with managers from governmental organisations to confirm and validate the data obtained from the survey, and use it to accomplish the triangulation required. Table 4.10 summarises all significant research approaches, and outlines the justification of the use of such approaches. Chapter Five analyses the collected data, explains all of the statistical tests performed, and then discuss the analysis results.

Approach	Paradigm/Tool	Justification
Philosophy	Positivist	This research has the evidence of hypothesis evaluation, quantifiable measures of data, investigation of inferences about a research problem from a representative sample of a population.
Research	Deductive	Hypotheses was formed first from literature review, and then tested by statistically to validate
Mixed Research Method	Quantitative Method	To produce data that are more objective, relevant, and focused on the research phenomenon of the present research (Information quality and strategic benefits in e-Government)
	Qualitative Method	To confirm findings from the quantitative method. Also to seek to understand the impact of improvement of information quality in e-Government, and assert benefits gained.
Triangulation	Mixed methods of data collection	To compare, and validate the finding from the quantitative, and qualitative methods, which will enables the researcher to ensure the reliability and validity of this research.
Data Collection	Survey	Provides quantifiable measures of variables, such as information quality, and strategic benefits. Survey extracted from IQA model (Lee *et al.,* 2002), and the strategic benefits section was extracted from the framework of assessment and analysis of e-Government proposals (Montagna, 2005).
	Interviews	To confirm, and validate the information obtained from the questionnaire. An informal semi-structured interview allows interviewees to express their views freely about the relationships between information quality and organizational performance.
Sample	Probability Sampling	Target population was individuals who work for governmental organisations and who regularly computer-based information system. Random sample was used.
Analysis	SPSS – Survey Manual analysis - Interviews	To analyse the results collected from the survey, and interviews. Using stepwise multiple regressions. ANOVA tests, and examination of coefficients. Manual Analysis are used to manage and code interviews to analyse results, and apply triangulation.

Table 4.10: Summary of Research Approaches and its Justifications

Chapter 5: Data Analysis and Hypothesis Testing

5.1 Introduction

Chapter 4 provided a discussion and justification of the mixed method research approach adopted in this research. The choice was based on the theoretical framework of the research developed in Chapter 3 which indicated a focus on the main dimensions of information quality, and their impact on Strategic Benefits and Institutional Value of e-Government and how they ultimately affect performance. This chapter presents the analysis and discussion of data gathered to provide answers to the research questions formulated in Chapter 1. The chapter starts by presenting the results of a pilot study, implemented prior to the full-scale study to test the reliability and validity of the research instrument. Next, the full-scale study analysis is introduced and explained by employing quantitative and qualitative methods.

- The *quantitative* method is employed to analyse both the pilot and the full-scale study. Multiple regression, correlations and analysis of variance (ANOVA) are the main statistical methods of data analysis used in this research.

- For the *qualitative* data analysis, thematic analysis is used to develop a framework for describing and organising the qualitative data.

5.2 Pilot Study

A pilot study was performed before undertaking the full investigation to validate the questionnaire instrument and analysis methods. It provides a trial run for the questionnaire, which involves testing the adequacy of research instruments, identifying vague questions and testing the techniques of collecting and measuring data. Validation of the questionnaire instrument is a key process in the validation of data under study. It is important to ensure confirmation of collected data representation with the real world (Straub *et al.,* 2004). As reported in Section 4.7, face content validity of the pilot questionnaire was performed to ensure the content validity by identifying whether the questions agreed with the scope of the

items need to be measured and the extent to which these items reflect the research questions and theories.

The reliability test of the questionnaire was performed to check the degree of consistency between the questionnaires' items and the attributes supposed to be measured. Cronbach's Alpha Coefficient test was performed to ensure the reliability of the questioners. The test was repeated to the same sample of people on two occasions and then the coefficients were compared. Reliability coefficient of 0.7 and above is recognised satisfactory (Hinton et al., 2004). The coefficient values lie between the range from 0.0 to + 1.0, where the higher values reflect a higher consistency. In Table 5.1, Cronbach's alpha coefficient values of the two part of the questioner is shown. As the coefficient values are greater than 0.7, it can be said that this pilot study has a good level of internal consistency (Hinton *et al.*, 2004).

Number	Part	No. of Items	Cronbach's Alpha
1	Strategic benefits from Information use	16	0.8215
2	Information Quality Assessment	33	0.8719

Table 5.1: Cronbach's Alpha Coefficient of the Pilot Study

5.3 Descriptive Analysis

This section presents a description of the demographic characteristics of the full-scale study participants including: Educational Background, Occupation and the Experience Level of using governmental information systems. In terms of education level, nearly half of the participant (48.5%, count = 130) held a diploma degree, followed by 39.6% (i.e. count = 106) who held a bachelor's degree. Participants with high school and below represented 10.8% (i.e. count = 29), with the remaining 1.1% (i.e. count = 3) of the participants had higher education. Figure 5.1 illustrates the frequency and percentages of the participants' education level.

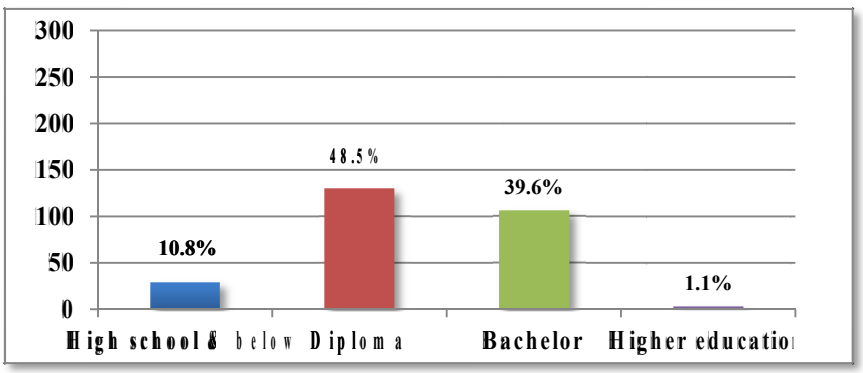


Figure 5. 1: Education Levels of the Participants

The participants' occupation was grouped into four categories. The majority of the participants (90.3%, count = 242) were employees, followed by 7.1% (i.e. count = 19) section heads, 2.2% (i.e. count = 6) managers and 0.4% (i.e. count = 1) directors or above. Figure 5.2 show the breakdown of the participants' occupation, diagrammatically.

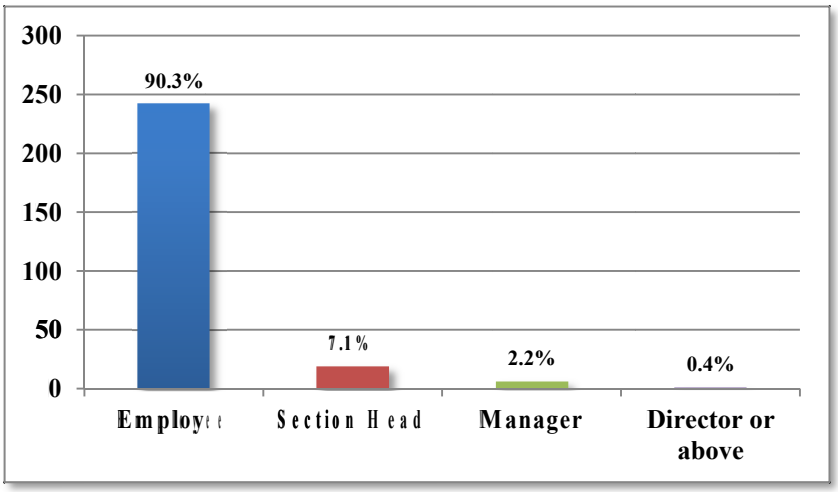


Figure 5. 2: Occupations of the Participants

The time of using governmental information systems was varied among the participants. Nearly third of the participant (29.3%, count = 78) have been using these systems for more than 5 years, followed by 26.3% (i.e. count = 70) for 1-3 years, then, 15.4% (i.e. count = 41) for 3-5 years, 13.2% (i.e. count = 35) less than one year and 15.8% (i.e. count = 42) for those who stated that they never used these systems before. Figure 5.3 illustrates the breakdown of the participants by their use of governmental information systems, diagrammatically.

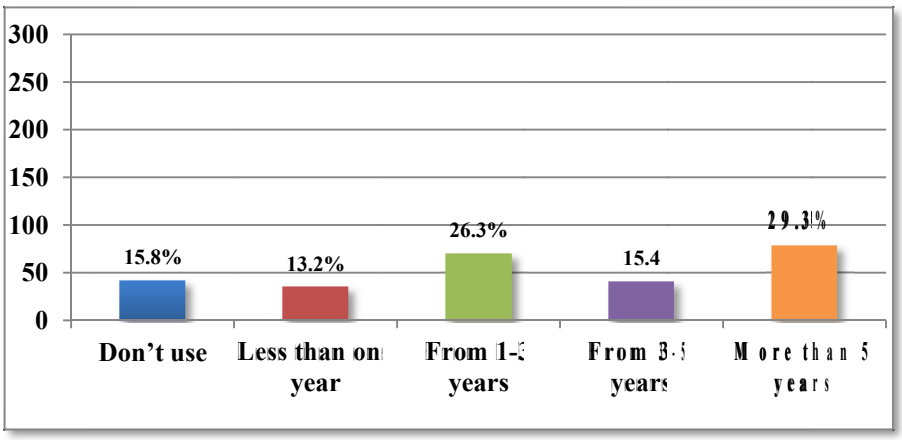


Figure 5. 3: E-Government Usage

5.4 Quantitative Analysis and Hypothesis Testing

Section 5.1 discussed the reliability and validity tests of the pilot study. These tests were pre-instruments validation process. On the contrary, this section presented the reliability analysis results for the full-scale questionnaire. Cronbach's Alpha Coefficients were used to examine the consistency of the questionnaire items. The coefficient values were 0.8005 for the strategic benefits part and 0.7719 for the information quality assessment part (Table 5.2). These values were comparable to the coefficient values reported for the pilot study. Consequently, it can be concluded that the full-scale questionnaire has a good level of internal consistency and can be considered to be reliable in the context of this thesis.

Number	Part	No. of Items	Cronbach's Alpha
1	Strategic benefits from Information use	16	0.8005
4	Sound Information	7	0.801
5	Useful Information	7	0.85
6	Dependable Information	10	0.704
7	Usable Information	9	0.79

Table 5.2: Cronbach's Alpha Coefficient of the Full-Scale Questionnaire

The twelve (12) hypothesis formulated in chapter three were tested using three dependent variables namely strategic benefits, institutional value and organisational performance against information quality dimensions and their components as independent variables. The hypothesis H1-H8 and H11-H12 were evaluated using a stepwise multiple regression analysis to identify the independent variables that were considered as predictors of the dependent variables. Analysis of the residuals revealed no evidence of violations of the assumptions of linearity, normality, or homoscedasticity, therefore the results of the multiple regression analysis are accepted and the null hypothesis (H1…H12 = null) rejected.

Summary of the results of the analysis is given in Table 5.3, showing dependant variable, independent variables, predictors and their predictive accuracy. The following sections discuss the results of individual hypothesis showing the derived predictive models and their coefficients.

Hypothesis	Dependant Variable	Independent Variables	Predictor Variables	Prediction Accuracy
H1: *Improvements in the Soundness of Information Increase Strategic Benefits.*	Strategic benefits	Freedom from error, Concise representation, Consistent representation and Completeness	Concise and consistent representation	61.3%
H2: *Improvement in the Dependability of Information Increase Strategic Benefits.*	Strategic benefits	Timeliness and Secure information	Timeliness	63.9%
H3: *Improvements in the Usefulness of Information Increase Strategic Benefits.*	Strategic benefits	Appropriate amount, Interpretability, Relevancy, Objectivity and Understandability	Interpretability, Appropriate amount and Relevancy	71.50%
H4: *Improvements in the Usability of Information Increase Strategic Benefits.*	Strategic benefits	Believability, Ease of use, Reputation, Accessibility and Value-added	Value-added and Ease of use	75.50%
H5: *Improvements in the Soundness of Information Increase Institutional Value.*	Institutional value	Freedom from error, Concise representation, Consistent representation and Completeness	Concise representation and Free of errors	60.1%
H6: *Improvements in the Dependability of Information Increase Institutional Value.*	Institutional value	Timeliness and Secure information	Timeliness and Secure information	61.2%
H7: *Improvements in the Usefulness of Information Increase Institutional Value.*	Institutional value	Appropriate amount, Interpretability, Relevancy, Objectivity and Understandability	Interpretability, Appropriate amount and Relevancy	67.7%
H8: *Improvements in the Usability of Information Increase Institutional Value.*	Institutional value	Believability, Ease of use, Reputation, Accessibility and Value-added	Value-added, Ease of use and Believability	72.50%
H9: *There are differences among Information Sharing participants in respect to their view for the association between IQ and Strategic Benefits.*	Strategic benefits	Twenty of the target items (62.5%) were found to have significant differences at p = .01		
H10: *There are differences among information sharing participants in respect to their view for the association between IQ and Institutional Value*	Institutional value	Twenty-two of the target items (68.75 %) were found to have significant differences at p = .01		
H11: *Improvements in Strategic Benefits items enhance Organisational Performance.*	Organisational performance	Strategic benefits items	Consolidated services, Knowledge of users' needs, Communication channels, Quick reaction to users' needs and Links with partners	87.50%
H12: *Improvements in institutional value items enhance organisational performance.*	Organisational performance	Institutional value items	Institutional image, Control, Inspection and Creditability	88.4%

Table 5.3: Summary of the Research Hypothesis

5.4.1 Strategic Benefits of Information Quality

Strategic benefits include reaction to users' needs, consolidated services, enhancing communication links and the development of human resources (Montagna, 2005). As illustrated in Chapter 2, the literature offers some evidence that improvement in different areas of quality of information can positively affect the strategic outcomes. The delivery of sound, dependable, useful and usable information can help governmental organisations to deliver high standard e-Services to information systems users (Scott, 2011). Pearson's correlation coefficients analysis was conducted to investigate links and relationships between information quality and its components with the strategic benefits. The analysis results presented in Table 5.4 revealed that information quality and its components are highly correlated with the strategic benefits (correlation coefficients were in range from 0.755 to 0.815). To get further insight into the relationship between the variables, regression analysis was used and four hypothesis listed below (H1, H2, H3, H4) were formulated to examine links and relationships between quality information and strategic benefits.

	Soundness Information	**Dependable Information**	**Useful Information**	**Usable Information**
Soundness Information				
Dependable Information	.916**			
Useful Information	.842**	.872**		
Usable Information	.886**	.873**	.831**	
Strategic Benefits Mean	.815**	.807**	.755**	.758**

** *Significant at the 0.01 level.*

Table 5.4: Pearson's Correlation Matrix of Strategic Benefits and Information Quality

Strategic Benefits of Sound Information

H1: *Improvements in the Soundness of Information Increase Strategic Benefits.*

The independent variables related to this hypothesis include freedom from error, consistent representation, concise representation and completeness. The dependent variable represents the statistical mean of the variables of users' needs, consolidated services, communication links, and development of human resources. In testing this hypothesis, the multiple regression analysis is computed and reported in Table 5.5. The regression analysis supports the hypothesis and indicates two predictive models.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.776[a]	.602	.601	1.01890	.602	451.522	1	298	.000
2	.783[b]	.613	.610	1.00709	.010	8.032	1	297	.000

a. Predictors: (Constant), Sound_Con
b. Predictors: (Constant), Sound_Con, Sound_Cont

Table 5.5: Model Summary for H1

- ***Model 1***shows that concise representation of data as a significant predictor of strategic benefits, R2 = .602, R2 adj. = .601, F (1,298) = 451.522, p <.001. This model accounted for 60.2% of the variance in strategic benefits.

- ***Model 2***shows that concise and consistent data representation as predictors of strategic benefits, R2 = .613, R2 adj. = .610, F (1,297) = 8.032, p < .001. This model accounted for 61.3% of the variance in strategic benefits. The bivariate and partial correlation coefficients between the predictor and the dependent variable are presented in Table 5.6.

Model*		Unstandardised Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.001	.125		8.018	.000
	Sound_Con	.819	.039	.776	21.249	.000
2	(Constant)	.930	.126		7.387	.000
	Sound_Con	.627	.078	.594	8.066	.000
	Sound_Cont	.218	.077	.209	2.834	.000

**Dependent Variable: Strategic_mean*

Table 5.6: Coefficients for H1 Models

The multiple regression analysis results are accepted and therefore the null hypothesis (H1 null) is rejected. The analysis of ***H1*** revealed that improvements in the soundness of information will increase strategic benefits, more specifically concise and consistent representation dimensions that accounted together for 61.3% of the variance in strategic benefits. Figure 5.4 illustrates ranking of the information soundness predictors and a selection of predictors that were included in the final model. Combining concise and consistence representation signified the best predictor for strategic benefits.

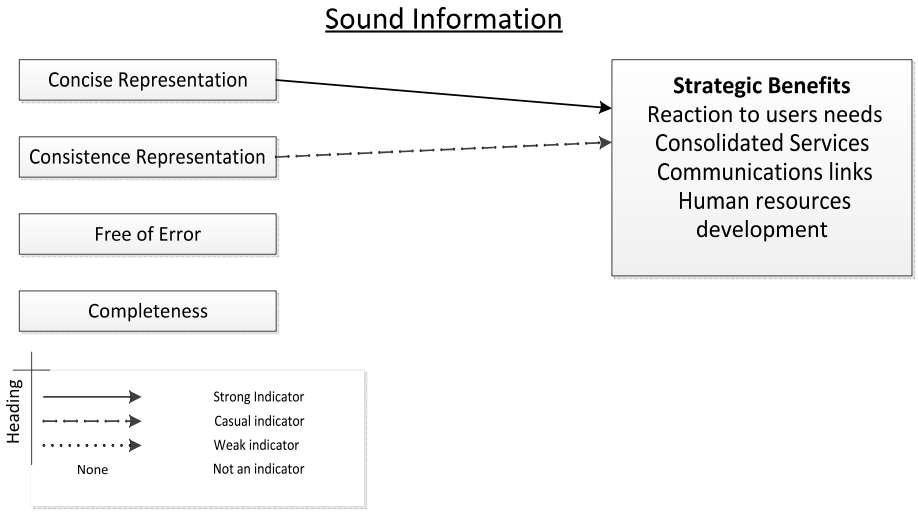


Figure 5. 4: Information Soundness Predictors of Strategic Benefits

Strategic Benefits of Dependable Information

H2: *Improvement in the Dependability of Information Increase Strategic Benefits.*

The independent variables associated with this hypothesis include timeliness and security. The dependent variable is represented in the statistical mean of the variables for users' needs, consolidated services, communication links, and development of human resources. The Regression results support partially H2 and indicate one predictive model as showing in Table 5.7.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.799[a]	.639	.638	.97122	.639	526.912	1	298	.000

a. Predictors: (Constant), Dependable_Time

Table 5.7: Models Summary for H2

- ***Model 1*** indicates timeliness as a significant predictor of strategic benefits, R2 = .639, R2 adj. = .638, F (1,298) = 526.912, p <.001. This model accounted for 63.8% of the variance in strategic benefits. The bivariate and partial correlation coefficients between the predictor and the dependent variable are presented in Table 5.8.

Model*		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.707	.128		5.533	.000
	Dependable_Time	.957	.042	.799	22.955	.000

** Dependent Variable: Strategic_mean*

Table 5.8: Coefficients for H2 Models

Similar to H1, The multiple regression analysis results are accepted and therefore the null hypothesis (H2 null) is rejected. Based on the analysis of H2, it is evident that improvements in the information dependability will increase strategic benefits. Timeliness dimension is the only dimension found as a good predictor and accounted for 63.9% of the variance in strategic benefits. Figure 5.5 illustrates the ranking of the information dependability predictors and the selection of predictors that were included in the final model.

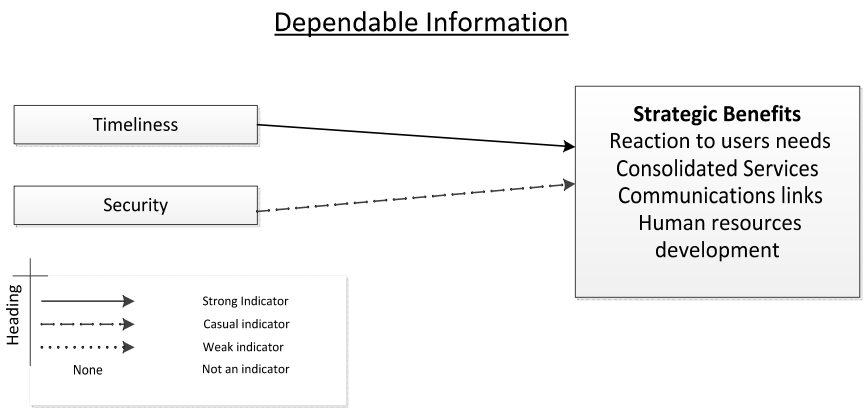


Figure 5. 5: Information Dependability Predictors of Strategic Benefits

Strategic Benefits of Useful Information

H3: *Improvements in the Usefulness of Information Increase Strategic Benefits.*

The independent variables associated with this hypothesis include appropriate amount, interpretability, relevance, objectivity and understandability. The dependent variable represents the statistical mean of the variables for users' needs, consolidated services, communication links, and development of human resources. The regression analysis of this hypothesis generated three predictive models as shown in Table 5.9.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.821[a]	.675	.674	.92147	.675	618.405	1	298	.000
2	.842[b]	.709	.707	.87268	.035	35.251	1	297	.000
3	.846[c]	.715	.712	.86508	.006	6.237	1	296	.013

a. Predictors: (Constant), Usefull_Inter
b. Predictors: (Constant), Usefull_Inter, Usefull_Amou
c. Predictors: (Constant), Usefull_Inter, Usefull_Amou, Usefull_Relav

Table 5.9: Models Summary for H3

- ***Model 1*** indicates interpretability as a significant predictor of strategic benefits, R2 = .675, R2 adj. = .674, F (1,298) = 618.405, p <.001. This model accounted for 67.50% of the variance in strategic benefits.

- ***Model 2*** indicates interpretability and appropriate amount as predictors of Strategic Benefits, R2 = .709, R2 adj. = .707, F (1,297) = 35.251, p < .001. This model accounted for 70.90% of the variance in strategic benefits.

- ***Model 3***indicates interpretability, appropriate amount and relevancy as predictors of Strategic Benefits, R2 = .715, R2 adj. = .712, F (1,296) = 6.237, p < .005. This model accounted for 71.50% of the variance in strategic benefits. The bivariate and partial correlation coefficients between the predictor and the dependent variable are presented in Table 5.10.

Model*		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.754	.117		6.449	.000
	Usefull_Inter	.885	.036	.821	24.868	.000
2	(Constant)	.552	.116		4.770	.000
	Usefull_Inter	.541	.067	.502	8.065	.000
	Usefull_Amou	.421	.071	.370	5.937	.000
3	(Constant)	.533	.115		4.634	.000
	Usefull_Inter	.427	.081	.396	5.282	.000
	Usefull_Amou	.337	.078	.295	4.307	.000
	Usefull_Relav	.192	.077	.191	2.497	.013

**. Dependent Variable: Strategic_mean*

Table 5. 10: Coefficients for H3 Models

As the case of H1 and H2, the multiple regression analysis results of H3 are accepted and therefore the null hypothesis (H3 null) is rejected. The analysis of ***H3*** revealed that improvements in the usefulness of information will increase strategic benefits and found that Interpretability, appropriate amount and relevancy are good predictors and accounted for

71.50% of the variance in strategic benefits. Figure 5.6 illustrates the ranking of the information usefulness predictors and the selection of predictors included in the final model.

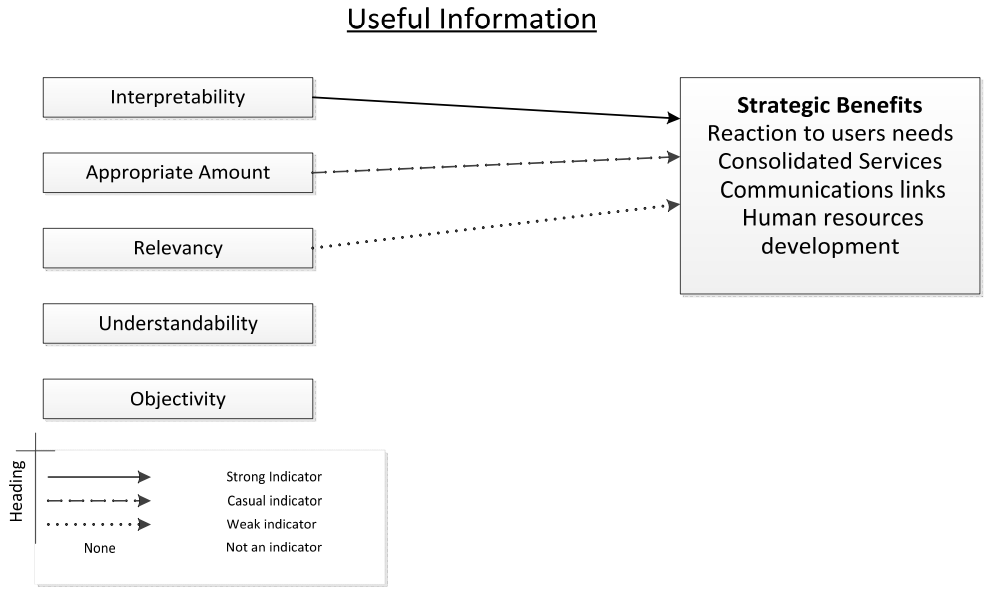


Figure 5. 6: Information Usefulness Predictors of Strategic Benefits

Strategic Benefits of Usable Information

H4: *Improvements in the Usability of Information Increase Strategic Benefits.*

The independent variables associated with this hypothesis include ease of operation, believability, reputation, value-added, accessibility. The dependent variable is the statistical mean of the strategic benefits elements, including users' needs, consolidated services, communication links, and development of human resources. Regression results indicate two predictive models as illustrated in Table 5.11.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.855[a]	.731	.730	.83834	.731	809.151	1	298	.000
2	.869[b]	.755	.754	.80078	.024	29.606	1	297	.000

a. Predictors: (Constant), Usable_Valu
b. Predictors: (Constant), Usable_Valu, Usable_Ease

Table 5.11: Models Summary for H4

- ***Model 1***shows that value-added as a significant predictor of Strategic Benefits, R2 = .731, R2 adj. = .730, F (1,298) = 809.151, p <.001. This model accounted for 73.10% of the variance in strategic benefits.

- ***Model 2*** shows that value-added and ease of use as predictors of Strategic Benefits, R2 = .755, R2 adj. = .754, F (1,297) = 29.606, p < .001. This model accounted for 75.50% of the variance in Strategic Benefits. Table 5.12 illustrates the bivariate and partial correlation coefficients between the predictor and dependent variable.

Model*		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.637	.107		5.972	.000
	Usable_Valu	.831	.029	.855	28.446	.000
2	(Constant)	.513	.104		4.909	.000
	Usable_Valu	.543	.060	.559	9.082	.000
	Usable_Ease	.349	.064	.335	5.441	.000

* Dependent Variable: Strategic_mean

Table 5.12: Coefficients for H4 Models

The multiple regression analysis results are accepted and therefore the null hypothesis (H4 null) is rejected. The analysis of ***H4*** revealed that improvements in the usability of information will increase strategic benefits. In addition, the analysis identifies value-added and ease of use as a good predictors of strategic benefit, where they accounted for 75.5% of the variance in it. Figure 5.7 illustrates the ranking of the information usability predictors and a selection of predictors that were included in the final model.

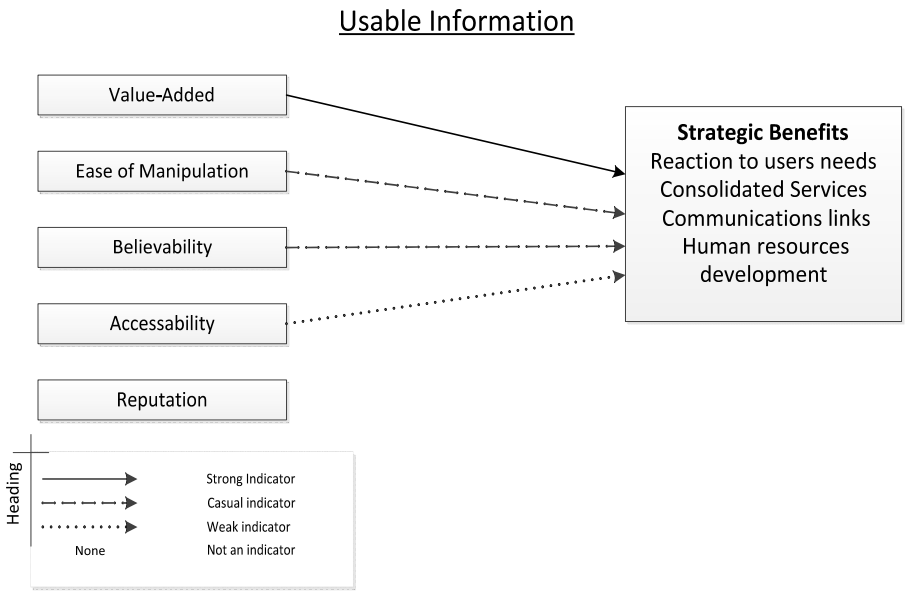


Figure 5. 7: Information Usability Predictors of Strategic Benefits

5.4.2 Institutional Value of Information Quality

Institutional value includes credibility, image, and accountability of the institution (Montagna, 2005). As presented in Chapter 2, it is widely recognised in the literature that improvement in various aspects of information quality will positively affect institutional values. The delivery of high quality information can help governmental organisations to deliver high standard e-services to information systems users (Scott, 2011). In order to examine empirically the relationships between the information quality and institutional value, the author calculated Pearson's correlation coefficients. The correlation analysis results presented in Table 5.13 revealed that information quality components are highly correlated with the institutional value (correlation coefficients were in range from 0.709 to 0.810). To get further insights into the relationship between the variables, regression analysis was used and the four hypothesis listed below (H5, H6, H7 and H8) were formulated to investigate the relationships between information quality and institutional value.

	Soundness Information	Dependable Information	Useful Information	Usable Information
Soundness Information				
Dependable Information	.916**			
Useful Information	.842**	.872**		
Usable Information	.886**	.873**	.831**	
Institutional Value Mean	.810**	.709**	.710**	.758**

*** Significant at the 0.01 level.*

Table 5.13: Pearson's Correlation Matrix of Strategic Benefits and Information Quality

5.4.2.1 Institutional Value of Sound Information

***H5**: Improvements in the Soundness of Information Increase Institutional Value.*

In this hypothesis, the dependant variables are freedom from error, concise representation, consistent representation and completeness. The dependent variable, institutional value, represents the statistical mean of the variables for credibility, institutional image, and accountability. Consistent with this hypothesis, the regression results in Table 5.13 support the existence of the positive relationships between information quality and institutional value. In addition, these results produced two predictive models as illustrated in Table 5.14.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.767[a]	.588	.586	1.06862	.588	424.586	1	298	.000
2	.775[b]	.601	.599	1.05241	.014	10.249	1	297	.000

a. Predictors: (Constant), Sound_Con
b. Predictors: (Constant), Sound_Con, Sound_error

Table 5.14: Coefficients for H5 Models

- ***Model 1*** indicates concise representation of data as a significant predictor of institutional value, R2 = .588, R2 adj. = .586, F (1,298) = 424.586, p <.001. This model accounted for 58.8% of the variance in institutional value.

- ***Model 2*** indicates concise data representation and free of errors as predictors of institutional value, R2 = .601, R2 adj. = .610, F (1,297) = 10.249, p < .001. This model accounted for 60.1% of the variance in institutional value. The bivariate and partial correlation coefficients between the predictor and the dependent variable are presented in Table 5.15.

Model*		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.858	.131		6.552	.000
	Sound_Con	.832	.040	.767	20.605	.000
2	(Constant)	.743	.134		5.551	.000
	Sound_Con	.605	.081	.557	7.428	.000
	Sound_error	.260	.081	.240	3.201	.002

** Dependent Variable: Institutional_mean*

Table 5.15: Coefficients for H5 Models

The multiple regression analysis results are accepted and therefore the null hypothesis (H5 = null) is rejected. The analysis of ***H5*** clearly demonstratedthat improvements in the soundness of information increase institutional value. Concise and free of error dimensions are good predictors and accounted together for 60.1% of the variance in institutional value. Figure 5.8 ranks the information soundness predictors based on their predictive power and illustrates the selection of predictors that were included in the final model.

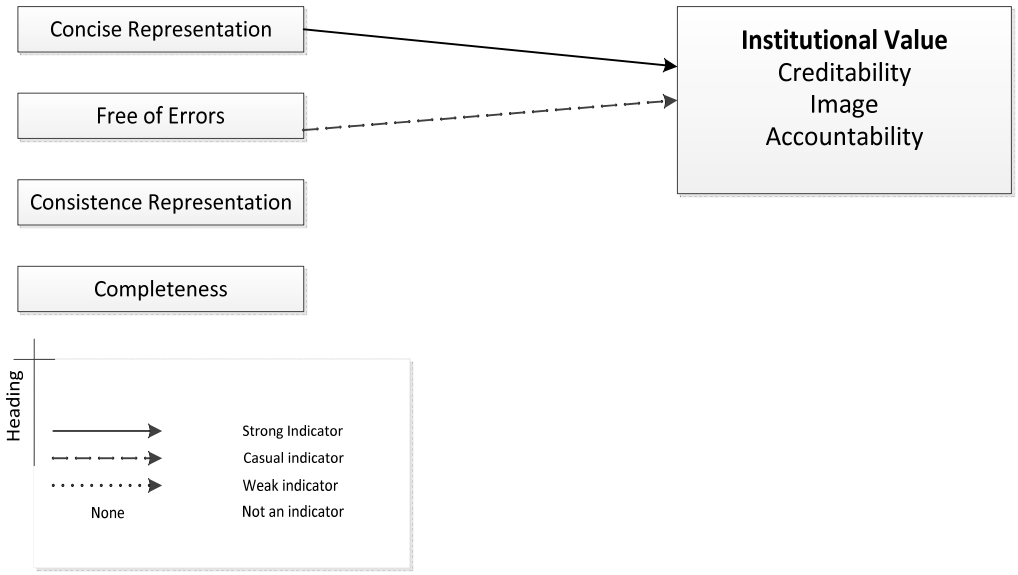


Figure 5. 8: Information Soundness Predictors of Institutional Value

Institutional Value of Dependable Information

***H6**: Improvements in the Dependability of Information Increase Institutional Value.*

In this hypothesis, the independent variables are timeliness and security and the dependent variable is the statistical mean of the variables for credibility, institutional image, and accountability. The regression results testing this hypothesis are presented in Table 5.16. As expected, the regression results clearly supports this hypothesis and produced two predictive models as shown below.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.779[a]	.607	.605	1.04347	.607	459.835	1	298	.000
2	.782[b]	.612	.609	1.03832	.005	3.964	1	297	.000

a. Predictors: (Constant), Dependable_Time
b. Predictors: (Constant), Dependable_Time, Dependable_sec

Table 5.16: Models Summary for H6

- ***Model 1*** indicates timeliness as a significant predictor of institutional value, R2 = .607, R2 adj. = .605, F (1,298) = 459.835, p <.001. This model accounted for 60.7% of the variance in institutional value.

- ***Model 2*** indicates timeliness and security as a significant predictors of institutional value, R2 = .612, R2 adj. = .605, F (1,297) = 3.964, p <.001. This model accounted

for 61.2% of the variance in institutional value. The bivariate and partial correlation coefficients between the predictor and the dependent variable are presented in Table 5.17.

Model*		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.594	.137		4.327	.000
	Dependable_Time	.960	.045	.779	21.444	.000
2	(Constant)	.543	.139		3.903	.000
	Dependable_Time	.808	.089	.655	9.125	.000
	Dependable_sec	.172	.086	.143	1.991	.047

** Dependent Variable: Institutional_mean*

Table 5.17: Coefficients for H6 Models

In line with the previous hypothesis, the multiple regression analysis results are accepted and therefore the null hypothesis (H6 = null) is rejected. The analysis of ***H6*** revealed that improvements in the information dependability will increase institutional value. Both timeliness and security dimensions found as good predictors and accounted for 61.20% of the variance in institutional value. Figure 5.9 shows ranking of the information dependability predictors and the selection of which predictors were included in the final model.

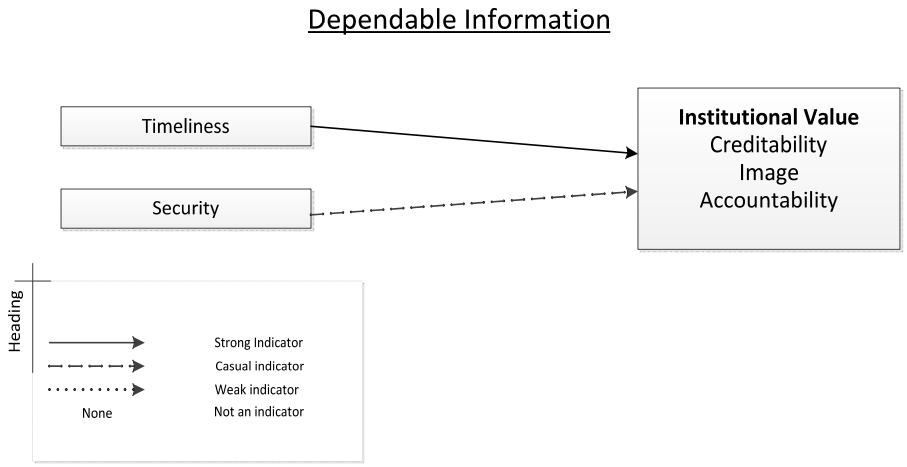


Figure 5. 9: Information Soundness Predictors of Institutional Value

Institutional Value of Useful Information

***H7**: Improvements in the Usefulness of Information Increase Institutional Value.*

The independent variables of with this hypothesis cover appropriate amount, interpretability, relevance, understandability and objectivity. The dependent variable, Institutional Value, is

the mean of the variables: credibility, institutional image, and accountability. The regression results are consistent with H7 and indicate three predictive models as illustrated in Table 5.18.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.792[a]	.628	.626	1.01554	.628	502.094	1	298	.000
2	.814[b]	.663	.660	.96816	.035	30.879	1	297	.000
3	.823[c]	.677	.673	.94930	.014	12.921	1	296	.000

a. Predictors: (Constant), Usefull_Relav, b. Predictors: (Constant), Usefull_Relav, Usefull_Inter
c. Predictors: (Constant), Usefull_Relav, Usefull_Inter, Usefull_Amou

Table 5.18: Models Summary for H7

- ***Model 1*** indicates relevancy as a significant predictor of institutional value, R2 = .628, R2 adj. = .626, F (1,298) = 502.094, p <.001. This model accounted for 62.8% of the variance in institutional value.

- ***Model 2*** indicates interpretability and relevancy as predictors of institutional value, R2 = .709, R2 adj. = .707, F (1,297) = 30.879, p < .001. This model accounted for 66.30% of the variance in institutional value.

- ***Model 3*** indicates interpretability, appropriate amount and relevancy as predictors of Institutional Value, R2 = .677, R2 adj. = .673, F (1,296) = 12.921, p < .005. This model accounted for 67.7% of the variance in institutional value. The bivariate and partial correlation coefficients between the predictor and the dependent variable are presented in Table 5.19.

Model*		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.689	.128		5.380	.000
	Usefull_Relav	.819	.037	.792	22.407	.000
2	(Constant)	.535	.125		4.272	.000
	Usefull_Relav	.435	.077	.421	5.624	.000
	Usefull_Inter	.462	.083	.416	5.557	.000
3	(Constant)	.428	.126		3.393	.001
	Usefull_Relav	.303	.084	.293	3.602	.000
	Usefull_Inter	.336	.089	.303	3.791	.000
	Usefull_Amou	.308	.086	.262	3.595	.000

** Dependent Variable: Institutional_mean*

Table 5.19: Coefficients for H7 Models

As the case with the previous hypotheses, the multiple regression analysis results are accepted and therefore the null hypothesis (H7 = null) is rejected. The analysis of ***H7*** revealed that

improvements in the usefulness of information will increase institutional value. Relevancy, interpretability and appropriate amount are good predictors and accounted for 67.7% of the variance in institutional value. Figure 5.10 shows ranking of the information dependability predictors based on productivity power and the selection of which predictors were included in the final model.

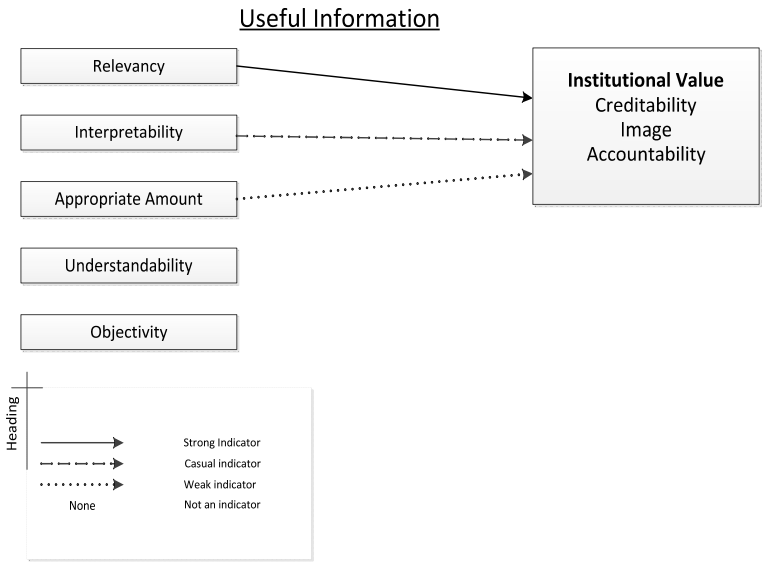


Figure 5. 10: Information Usefulness Predictors of Institutional Value

Institutional Value of Usable Information

***H8**: Improvements in the Usability of Information Increase Institutional Value.*

This hypothesis investigates the relationships between believability, reputation, ease of operation, , accessibility and value-added as independent variables and the mean of institution values variables as dependent variables. The regression results support the existence of positive relationship between dependability and institution values and indicate three predictive models as illustrated in Table 5.20.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.840[a]	.705	.704	.90337	.705	713.115	1	298	.000
2	.848[b]	.720	.718	.88263	.014	15.174	1	297	.000
3	.851[c]	.725	.722	.87599	.005	5.518	1	296	.000

a. Predictors: (Constant), Usable_Valu, b. Predictors: (Constant), Usable_Valu, Usable_Ease
c. Predictors: (Constant), Usable_Valu, Usable_Ease, Usable_Bel

Table 5.20: Models Summary for H8

- ***Model 1*** indicates value-added as a significant predictor of Institutional Value, R2 = .705, R2 adj. = .704, F (1,298) = 713.115, p <.001. This model accounted for 70.50% of the variance in institutional value.

- ***Model 2*** indicates value-added and ease of use as predictors of Institutional Value, R2 = .720, R2 adj. = .718, F (1,297) = 15.174, p < .001. This model accounted for 72.00% of the variance in institutional value.

- ***Model 3*** indicates value-added, ease of use and believability as predictors of Institutional Value, R2 = .725, R2 adj. = .722, F (1,296) = 5.518, p < .001. This model accounted for 72.50% of the variance in institutional value. The bivariate and partial correlation coefficients between the predictor and dependent variable are presented in Table 5.21.

Model*		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.503	.115		4.372	.000
	Usable_Valu	.840	.031	.840	26.704	.000
2	(Constant)	.404	.115		3.513	.001
	Usable_Valu	.613	.066	.613	9.307	.000
	Usable_Ease	.275	.071	.257	3.895	.000
3	(Constant)	.359	.116		3.094	.002
	Usable_Valu	.563	.069	.562	8.169	.000
	Usable_Ease	.202	.077	.188	2.629	.009
	Usable_Bel	.143	.061	.136	2.349	.019

** Dependent Variable: Institutional_mean*

Table 5.21: Coefficients for H8 Models

The multiple regression analysis results are accepted and therefore the null hypothesis (H8 = null) is rejected. The analysis of ***H8*** revealed that improvements in the usability of information will increase Institutional Value. Value-added, ease of use and believability are good predictors and accounted for 72.5% of the variance in Institutional Value. Figure 5.11 illustrates the ranking of the information usability predictors and a selection of predictors that were included in the final model.

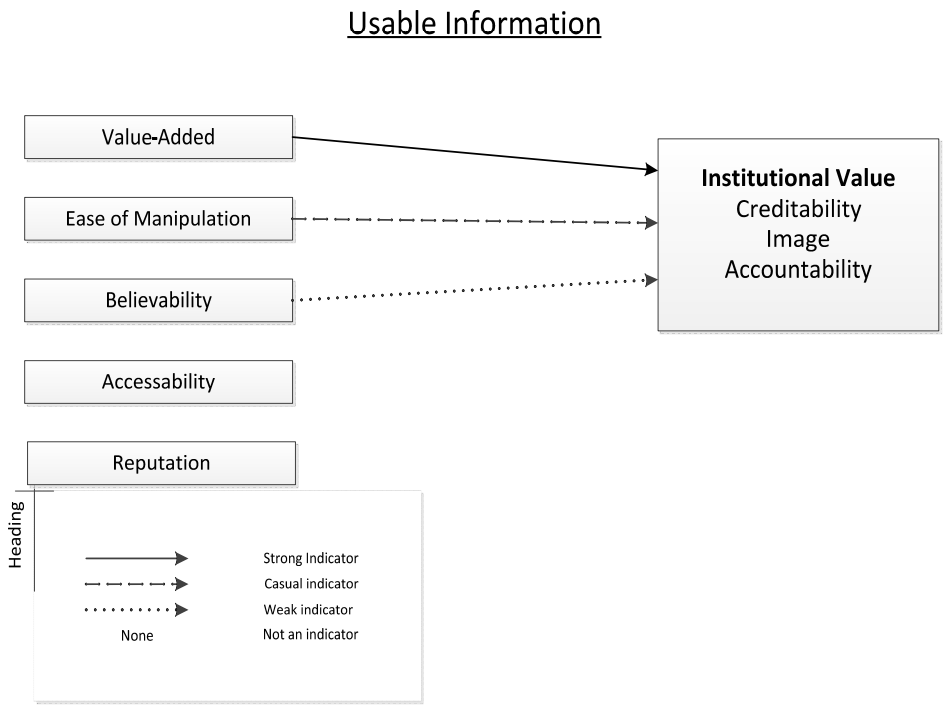


Figure 5.11: Information Usability Predictors of Institutional Value

5.4.3 Strategic Benefits of Information Quality: Participants View

As reported in Chapter 2, a review of the literature had revealed some differences among Information Sharing Participants (information providers, managers, and users) in respect to their view to the relationships between information quality and strategic benefits. Based on the literature review and the conceptual research model presented in Chapter 3, the hypothesis listed below (H9) investigates the relationships between information quality and strategic benefits from the participant perspective.

***H9**: There are differences among Information Sharing Participants in respect to their view for the association between Information Quality and Strategic Benefits.*

A one-way ANOVA test was performed on all the target items in the questionnaire to find out if there were significant differences in the information sharing participants. Twenty of the target items (62.5%) were found to have significant differences at p = .01. Given the high percentage, job title or function was considered to pose a systematic difference in response. Due of the latter result, the author decided to perform detailed correlation analysis, as described below, to assess the implications of these differences. The correlation analysis of the perception of different information sharing participants revealed that concise and consistent data representation dimensions are only the sound information factors that affect

Strategic Benefits. The analysis also showed that concise data representation had the strongest effect on Strategic Benefits. Figure 5.12 illustrates the relationships between strategic benefits and soundness as seen by information providers, information users and managers.

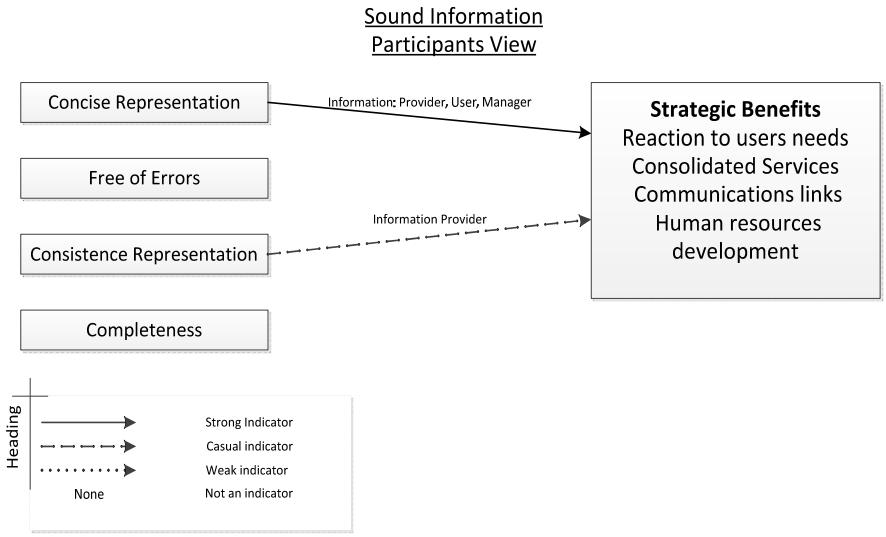


Figure 5.12: Information Soundness as a Predictor of Strategic Benefits: Participants View

Based on the correlation analysis, there were no differences among information sharing participants in respect to their view to the association between dependability dimensions and strategic benefits. All the participants found that timeliness has had the strongest effect on strategic benefits. Figure 5.13 illustrates the relationships between strategic benefits and dependability as measured by the different information sharing participants.

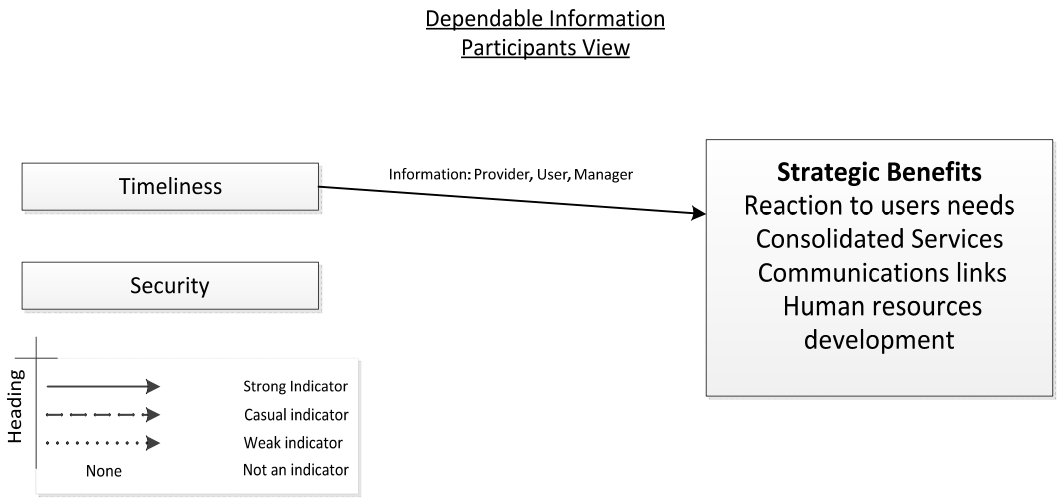


Figure 5.13: Information Dependability as a Predictor of Strategic Benefits: Participants View

Similar to the other information quality dimensions, the correlation analysis indicated some differences among information sharing participants in respect to their view for the association

between usefulness dimensions and strategic benefits. Unlike information managers, information users found that interpretability is associated with strategic benefits. On the contrary, information providers found that data relevancy is the only dimension that significantly affects strategic benefits. Figure 5.14 illustrates the relationships between strategic benefits and usefulness as measured by the different information sharing participants.

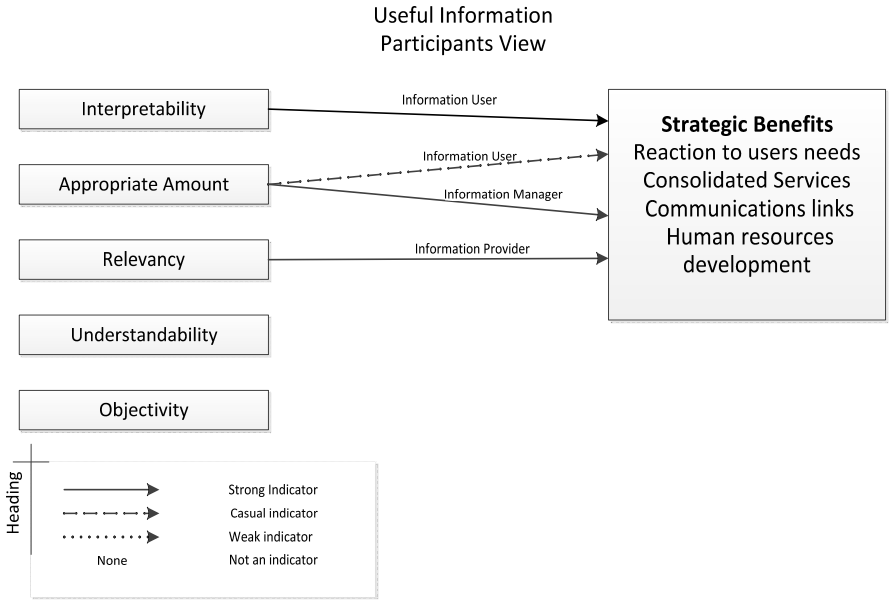


Figure 5.14: Information Usefulness as a Predictor of Strategic Benefits: Participants View

In the same way, the correlation analysis showed some differences between participants regarding to their view for the association between usability dimensions and strategic benefits. Information managers and providers shared the same view that the value-added dimension is the only dimension that had an effect on strategic benefits. Conversely, Information users found that value-added, ease of manipulation and accessibility are linked with strategic benefits. Figure 5.15 illustrates the relationships between strategic benefits and usability as perceived by the different information sharing participants.

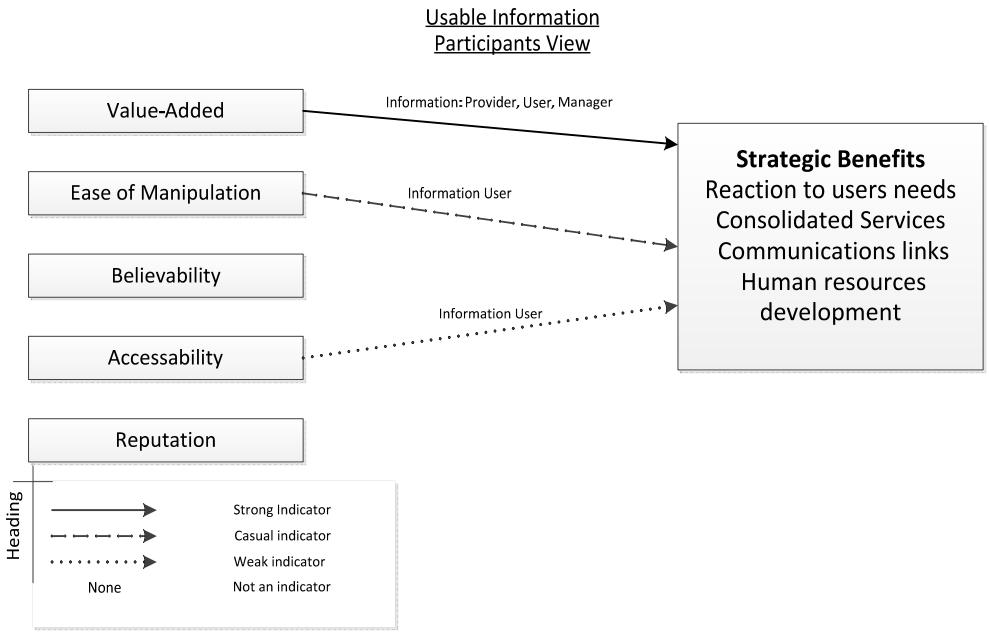


Figure 5.15: Information Usability as a Predictor of Strategic Benefits: Participants View

5.4.4 Institutional Value of Information Quality: Participants View

Institutional value includes credibility, image, and accountability of the institution (Montagna, 2005). Based on the literature review and the conceptual research model presented in Chapter 3, it is assumed that improvement in various aspects of information quality will positively affect these institutional values. It is also assumed that the participants view (information providers, managers, and users) may vary as to which quality dimensions are predictors of institutional value. In order to examine these differences, the hypothesis listed below formulated to investigate the relationships between information quality and institutional value from the different participant perspective.

***H10**: There are differences among Information Sharing Participants in respect to their view for the association between Information Quality and Institutional Value.*

A one-way ANOVA test was performed on all the target items in the questionnaire to find out if there were significant differences among the different information sharing participants. Twenty-two of the target items (68.75 %) were found to have significant differences at p = .01. Given the high percentage, job title or function was found to pose a systematic difference in response. Due of this result, the author decided to conduct detailed correlation analysis, as described below, to assess the implications of these differences.

Similar to the strategic benefit, information providers and users found concise data representation dimensions had the strongest effect on institutional value. In addition, to concise representation, information providers found that consistence representation had an effect on institutional value. In contrast, Information users were distinct from other roles and found that consistence representation had the strongest effect on institutional value. Figure 5.16 illustrates the relationships between institutional value and soundness as measured by the different information sharing participants.

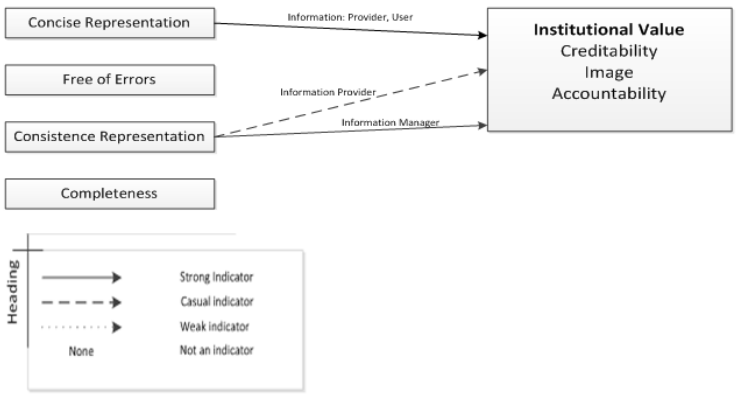


Figure 5. 16: Information Soundness as a Predictor of Institutional Value: Participants View

Unlike strategic benefit, there were differences among information sharing participants in respect to their individual views to the association between dependability dimensions and institutional value. Information provider and users found that timeliness had the strongest effect on institutional value. On the contrary, information managers found that security had the strongest effect on institutional value. Figure 5.17 illustrates the relationships between institutional value and dependability as measured by information providers, information users and managers.

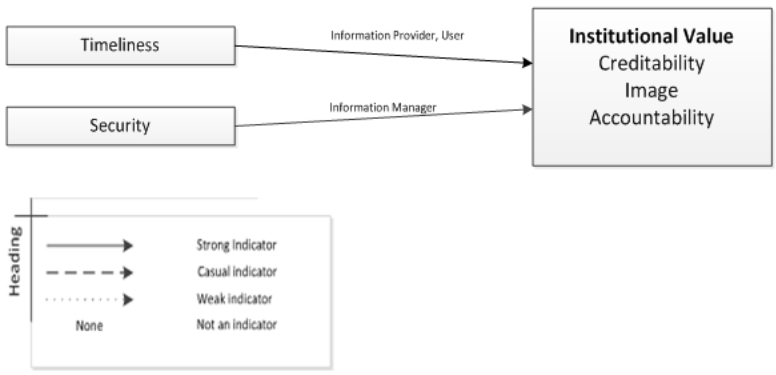


Figure 5. 17: Information Dependability as a Predictor of Institutional Value: Participants View

Same as strategic benefit, there were differences among information sharing participants in respect to their view for the association between usefulness dimensions and institution value.

Information manager and users found that appropriate amount is linked with institutional value. Unlike information managers, information users found that interpretability is associated with institution value. On the contrary, information providers found that data relevancy is the only dimension that significantly affects institution value. Figure 5.18 illustrates the relationships between institution value and usefulness as measured by information providers, information users and managers.

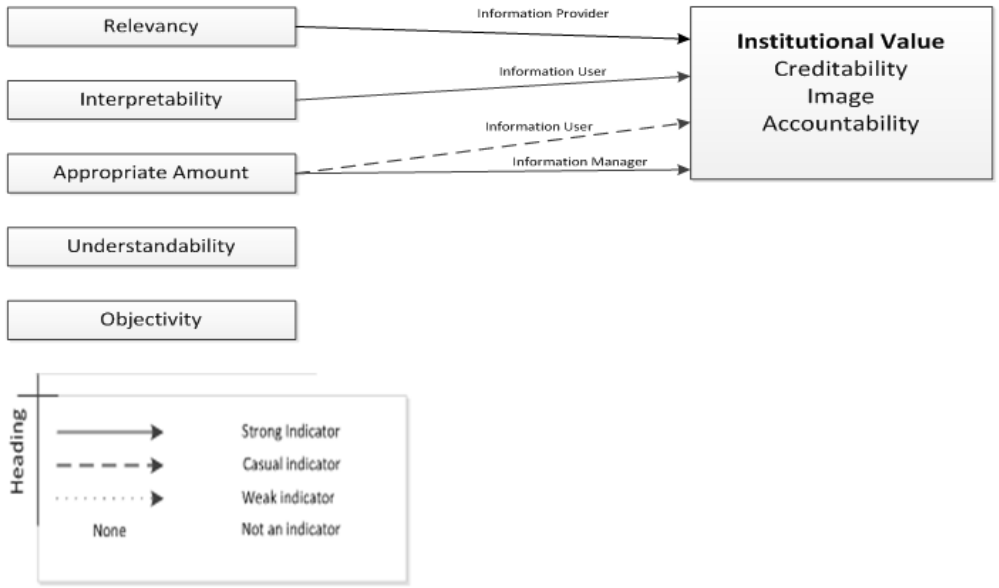


Figure 5. 18: Information Usefulness as a Predictor of Institutional Value: Participants View

Likewise, there were some differences between participants regarding to their view of the links between usability dimensions and institutional value. All information sharing participants found that value-added had the greatest effect on institutional value. Distinct from the other participants, information users found a link between ease of manipulation and institutional value. Figure 5.19 shows the relationships between institutional value and usability as measured by information providers, information users and managers.

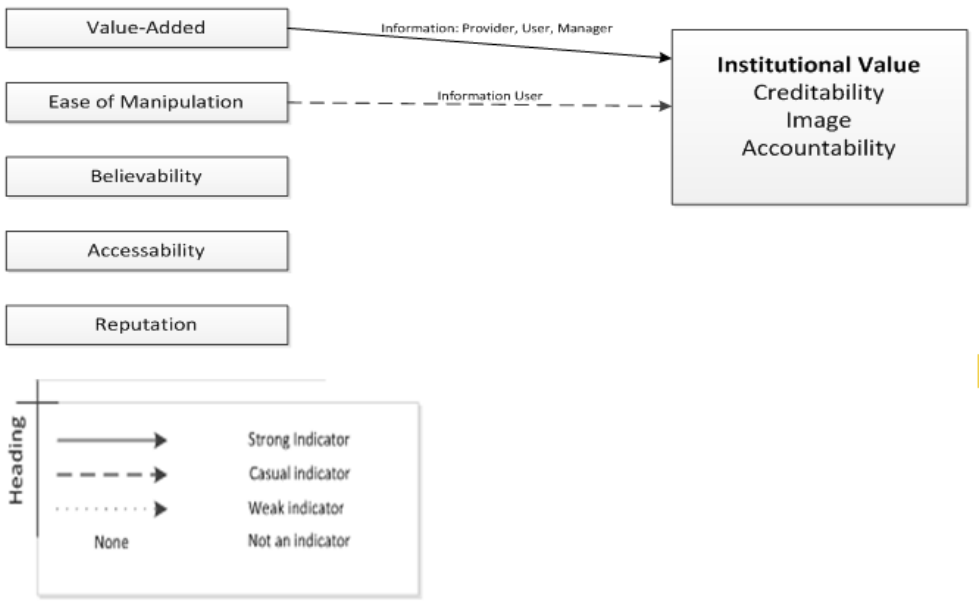


Figure 5. 19: Information Usability as a Predictor of Institutional Value: Participants View

5.4.5 Strategic Benefits Impact on Organisational Performance

The strategic benefits construct include factors such as reaction to users' needs, consolidated services, enhancing communication links and the development of human resources. According to Morgan (2005), these factors are considered as determinants of organisational performance. Therefore, it can be postulated that improvement of different strategic benefits constructs can positively affect organisational performance. In order to investigate the relationship between strategic benefits and organisational performance, regression analysis was used and the hypothesis listed below (***H11***) was formulated.

H11: *Improvements in Strategic Benefits items enhance Organisational Performance.*

To evaluate ***H11***, stepwise multiple regression analysis was used to identify the strategic benefits constructs that affect organisational performance. The independent variables analysed in this hypothesis include all the strategic benefits variables. The dependent variable of this hypothesis is the statistical mean of the organisational performance variables. The regression results support clearly the hypothesis and produce five predictive models as illustrated in Table 5.22.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.905[a]	.819	.818	.67753	.819	1345.028	1	298	.000
2	.925[b]	.855	.854	.60704	.036	74.233	1	297	.000
3	.932[c]	.868	.867	.57888	.014	30.600	1	296	.000
4	.934[d]	.872	.870	.57167	.004	8.507	1	295	.004
5	.935[e]	.875	.873	.56665	.003	6.257	1	294	.013

a. Predictors: (Constant), Strategic_consolid, b. Predictors: (Constant), Strategic_consolid, Strategic_Know
c. Predictors: (Constant), Strategic_consolid, Strategic_Know, Strategic_comm
d. Predictors: (Constant), Strategic_consolid, Strategic_Know, Strategic_comm, Strategic_quick
e. Predictors: (Constant), Strategic_consolid, Strategic_Know, Strategic_comm, Strategic_quick, Strategic_Links
f. Dependent Variable: Performance_mean

Table 5.22: Models Summary for H11

- ***Model 1*** indicates consolidated services as a significant predictor of organisational performance, R2 = .905, R2 adj. = .818, F (1,298) = 1345.028, p <.001. This model accounted for 81.9% of the variance in organisational performance.

- ***Model 2*** indicates consolidated services and Knowledge of users' needs as predictors of organisational performance, R2 = .925, R2 adj. = .854, F (1,297) = 74.233, p < .001. This model accounted for 85.5% of the variance in organisational performance.

- ***Model 3***indicates consolidated services, Knowledge of users' needs and communication channels as predictors of organisational performance, R2 = .932, R2 adj. = .868, F (1,296) = 5.518, p < .001. This model accounted for 86.8% of the variance in organisational performance.

- ***Model 4***indicates consolidated services, knowledge of users' needs, communication channels and quick reaction to users' needs as predictors of organisational performance, R2 = .934, R2 adj. = .872, F (1,295) = 5.518, p < .001. This model accounted for 87.2% of the variance in organisational performance.

- ***Model 5***indicates consolidated services, knowledge of users' needs, communication channels, quick reaction to users' needs and links with partners as predictors of organisational performance, R2 = .935, R2 adj. = .875, F (1,294) = 5.518, p < .001. This model accounted for 87.50% of the variance in organisational performance.

As with the previous hypothesis, the multiple regression analysis results are accepted and therefore the null hypothesis (H11 = null) is rejected. The analysis of H11 revealed that improvements in the strategic benefits will increase organisation performance. The regression

analysis identifies consolidated services, knowledge of users' needs, communication channels, quick reaction to users' needs and links with partners as strong predictors for organisation performance, where they accounted for 87.5% of the variance in organisation performance.

5.4.6 Institutional Value Impact on Organisational Performance

The institutional value construct covers factors such as credibility, institutional image, and accountability. According to Morgan (2005), these factors are considered as good indicators of organisational performance. So based on this, it is assumed that improvement in various aspects of institutional value will positively affect organisational performance. In order to investigate this assumption, the hypothesis listed below (H12) was formulated.

H12: *Improvements in Institutional Value items enhance Organisational Performance.*

Similar to the previous hypothesis, stepwise multiple regression analysis was used to identify the institutional value variables that best predict organisational performance. As expected, the regression analysis supported H12 produced four predictive models as showing in Table 5.23.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.889[a]	.790	.790	.72840	.790	1123.548	1	298	.000
2	.931[b]	.867	.866	.58221	.076	169.452	1	297	.000
3	.936[c]	.877	.876	.56000	.010	25.023	1	296	.000
4	.940[d]	.884	.883	.54354	.008	19.193	1	295	.000

a. Predictors: (Constant), Institutional_imag, Dependent Variable: Performance_mean
b. Predictors: (Constant), Institutional_imag, Institutional_control
c. Predictors: (Constant), Institutional_imag, Institutional_control, Institutional_inspection
d. Predictors: (Constant), Institutional_imag, Institutional_control, Institutional_inspection, and credibility

Table 5.23: Models Summary for H12

- ***Model 1*** indicates institution image as a significant predictor of organisational performance, R2 = .790, R2 adj. = .790, F (1,298) = 1123.548, p <.001. This model accounted for 79.0% of the variance in organisational performance.

- ***Model 2***indicates institutional image and institutional control as predictors of organisational performance, R2 = .867, R2 adj. = .866, F (1,297) = 169.452, p < .001. This model accounted for 86.7% of the variance in organisational performance.

- ***Model 3***indicates institutional image, control and inspection as predictors of organisational performance, R2 = .877, R2 adj. = .876, F (1,296) = 25.023, p < .001. This model accounted for 87.7% of the variance in organisational performance.

- ***Model 4*** indicates institutional image, control, inspection and credibility as predictors of organisational performance, R2 = .884, R2 adj. = .883, F (1,295) = 19.193, p < .001. This model accounted for 88.4% of the variance in organisational performance.

Bases on the results presented in Table 5.22, it can be conclude that regression analysis results are accepted and therefore the null hypothesis (H12 = null) is rejected. In addition, the results reveal that improvements in institution values will increase organisation performance. Moreover, the results identify institutional image, control, inspection and credibility as strong predictors of organisation performance, where they accounted for 88.4% of the variance in organisation performance. To that end, and to summarise, the quantitative analysis supports all the twelve hypothesis and revealed evidences that there are relationships between information quality, strategic benefits, institutional values and organisational performance. These relationships are systematically measurable and can be used to predict organisational benefits and performance. In order to provide a more elaborate qualitative understanding of these relationships, next sections report the results of the qualitative analysis.

5.5 Qualitative Data Analysis

The quantitative analysis in Section 5.4 illuminates relationships between information quality, strategic benefits, institutional values and organisational performance. The major finding of quantitative analysis showed support for the positive associations between the information quality and the organisation performance. However, the quantitative analysis does not provide answers for the 'Why' questions. Therefore, this section attempts to investigate further the relationships between the constructs covered in this research by using thematic qualitative analysis. This section presents the findings of the qualitative data analysed using thematic methods explained in the data analysis section of chapter four. The qualitative analysis in this section is based on the themes, sub-themes and codes identified in Table 4.9.

The qualitative data for this research is drawn from a field research conducted in Kuwait in May 2011 and a thematic analysis of semi-structure interviews with stakeholders in three governmental agencies, namely, Ministry of Justice (A1), Ministry of Finance (A2) and Public Authority for Civil Communication (A3). Table 4.8 shows information on

demographic characteristics and profiles of the stakeholders being interviewed. Ministry of Justice is one of the important ministries in Kuwait as it encompasses many departments which receive thousands of transactions from both citizens and businesses. Its work spans a wide range of legal and Justice Issues, including criminal, civil justice, arbitration and democracy and rights. Ministry of Finance is one of the central and core agencies of Kuwaiti government. It is responsible for the public treasury, state investment, central bank, fields of international economic cooperation, budget implementation and monetary investment. The third agency is the Public Authority for Civil Communication. It is a government agency responsible for registration of population and issuing marriage, birth, death and divorce documentations as well as collecting statistics related to all civil events.

All three governmental agencies are engaged in diverse but overlapping e-government services and depend on similar or identical information. They usually interact with the same population, but at different points in time. For example, in order for citizens need to receive services from Ministry of Justice they need to use a payment gateway linked directly with the Ministry of Finance. During the payment process, citizens' information are exchanged in encrypted format between the two ministries. In another example from the Public Authority for Civil Communication, the process of renewing civil ID cards involves exchanging information between the Authority and Ministry of Justice to check criminal record and insure that citizens applying for renewal are not wanted by the law. An overview of the results and findings of the thematic analysis is presented in Figure 5.20.

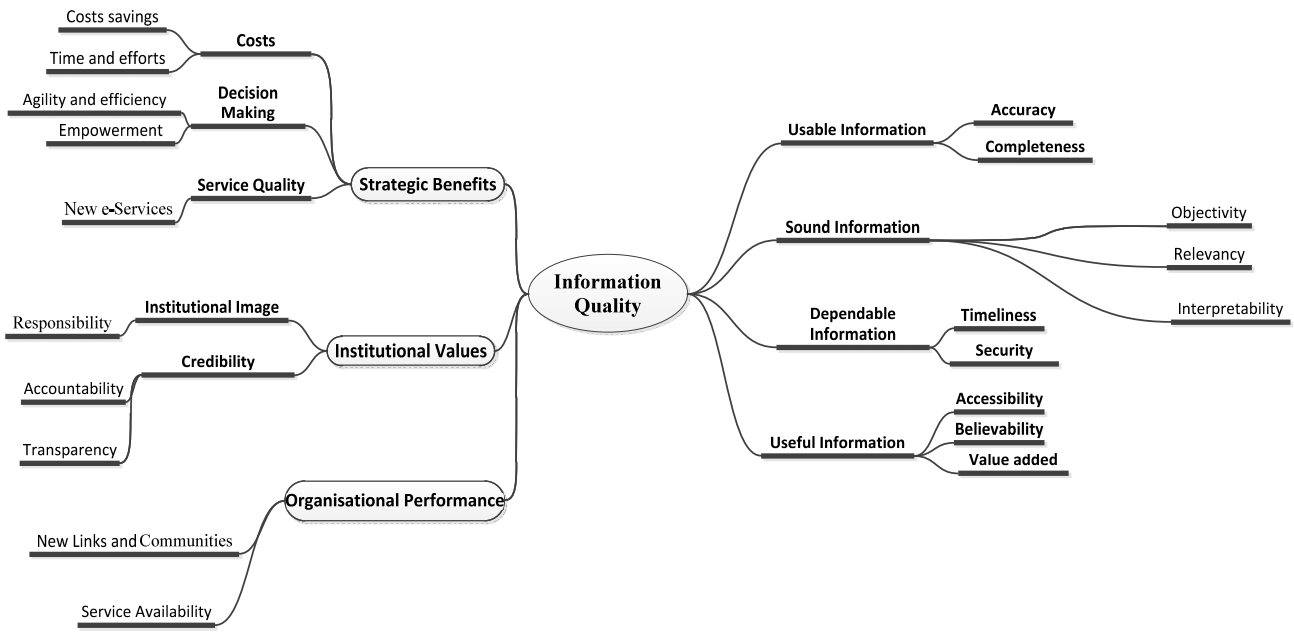


Figure 5.20: Thematic Mind Map of the Qualitative Data Analysis.

As discussed in section 4.9.2, the thematic network in Figure 5.20 is not based on content analysis. Therefore, the number of times that a code appears in the text is not considered. The collected codes were identified and then grouped into sub-themes and themes according to the relationships between the variables, which have been identified in the quantitative analysis. The thematic network does not represent cause-and-effect diagram, but it rather depicts the hierarchy and the links between the themes and sub-themes. This network consists of four main themes:

Information Quality theme: This theme highlights the four dimensions of information quality, the soundness, usefulness, dependability and usability of the information produced by the e-Government websites and services. It also shows how the users perceive the product quality of information produced and the service quality of the information from the government. This theme is placed in the centre of the network to make the network easy to follow and to understand.

Strategic Benefits theme: This theme highlights the participants' views on the benefits gained from the use of the e-government systems. The benefits are summed up in the cost savings achieved and the ease of the decision making process that enhanced agility and efficiency in the business organisations. This theme includes three sub-themes covering: Cost, service quality and decision making.

Institutional value theme: This theme highlights the participants' views on e-Government initiatives to improve institutional image and institutional initiatives. This theme includes two sub-themes covering: Institutional image and credibility.

Organizational performance theme: This theme highlights the participants' views on the impact of information quality on organizational performance. This theme includes two sub-themes covering: Links and communities and service availability.

5.6 Information Quality Theme

This theme highlights the four dimensions of information, the soundness, usefulness, dependability and usability of the information produced by the e-Government websites and services. It also shows how the users perceive the product quality of information produced and the service quality of the information from the government.

5.6.1 Sound information

The findings show that sound information described as information that conforms to specific standards of quality such as accuracy and completeness contribute to both use and user satisfaction. It is closely associated with system use and net benefits, more significant than other criteria and influences the adoption of government websites (Wangpipatwong *et al.,* 2005; DeLone and McLean 1992). Sound information was seen by many participants as a prerequisite to provide timely and efficient services. The importance of sound information on strategic benefits was emphasized on multiple segments in the text. In addition, many participants went beyond the link between strategic benefit and information quality to demonstrate the relationship between sound information and organisational performance. Some participants stated that sound information can lead to an increase use of e-Government services, while others indicated that sound information can improve the institution's image.

Accuracy

Most of the participants describe the quality of information provided by government websites as accurate and of high standard capable of enhancing their business goals and objectives. There has been a remarkable improvement in the soundness of the information provided by government which has resulted into an increased confidence and reliance on government information by the users. The following quotes highlight two participants' perception about the importance of information accuracy.

> "*There is a remarkable improvement in the level and quality of information provided by government websites. Its accuracy cannot be faulted and we therefore find it reliable as we use it to pursue our business goals*" [A1, User]

> "*Our work relies on accurate, up-to-date and timely information, and therefore to us, these characteristics of information determine the quality of information and are key issues we consider in choosing the sources of our information*" [A2, Manager]

Participants appreciate the efforts of the government departments in ensuring the production of accurate and reliable information targeted at the needs of the business users in the economy. These efforts are yielding good results and good image for the government.

"*We are satisfied with the quality of information we get from our government websites, this has helped our business to move forward*" [A2, User]

"*We in the government are aware of the importance of information quality in terms of accuracy and reliability; we therefore focus on producing and delivering quality information to meet the needs of our clients in their various endeavours*" [A1, Provider]

"*We have had some impressive reports on how the quality of the information produced by our government websites have been of great help to business users and other users, we have had to work on improving our production process and glad to know it is yielding good result and image for the government*" [A3, Manager]

The emphasis on having product quality that conforms to required standards of information needed to meet the needs of the clientele was made by government departmental staff. It was highlighted that government is concerned about the poor quality of information usually associated with the government websites and services which has adversely affected business users in particular in recent times.

"*We acknowledge the need to conform to standards of information quality as this is the only way the information produced and provided will be of any good to our customers. Our efforts are therefore focused in that direction*" [A1, Manager]

Completeness

The study also confirms the government's efforts in ensuring the provision of not just accurate information but sufficient information and details enough to assist the users in their business tasks. The user is able to have complete set of information in any required area and nothing is deliberately kept back or negligently missing. This was discovered to have helped the business users in efficiently and effectively carried out their tasks and meeting their customers' demand.

"*Having sufficient information makes you a complete organisation ready to take any right decisions, deal with prevailing situations and the constantly changing demands of the clients* "[A3, Manager]

> "*Most organisations including some government departments hoard information which adversely affects the operations of business owners who are unable to service the needs of their market. But sometimes you have an information overload which also forces information users to sift through the load of information to get what is actually needed. Neither of these situations has ever helped businesses*" [A2, User]

Participants also highlighted the usefulness of the complete and sufficient information in providing cost-effective services to their clients. It has minimised the time delays and costs of getting all required vital information usually achieved by going round all the government departments and running after staff officers of the departments concerned.

> "*We have experienced cost savings in our search for valuable information required for efficient services*" [A1, User]

> "*Complete information helps us to answer our customers' questions quickly and effectively. It helps our staff to act quickly thereby providing better accurate and timely services to our clients*" [A2, Manager]

5.6.2 Useful information

The objectivity, interpretability and relevancy of the information produced by government websites were major issues raised concerning the product quality as these determine the usefulness of information.

Objectivity

Concerns were raised about the objectivity of the information provided. While most participants believe the efforts of the government in providing complete information, the unbiased nature of the information may be of doubt. Participants are of the opinion that the government may have given out information that have been doctored to protect the image of the government and to suit the best interest of the government. There is therefore the fear of the government providing information that is without bias, prejudices and impartiality.

> "*We rely on free and unadulterated information that is one hundred per cent objective and portrays the true reality of the situation, but sometimes we have*

reason to doubt the sincerity of the information we get from government departments" [A2, User]

"*In as much as we trust in the accuracy of the information provided, It will still be preferred if the real information will not be replaced with government's interpretation or opinion of the situation*" [A1, Manager]

Interpretability

The product quality in terms of the appropriate symbols and languages used to enhance easy understanding and interpretability is however commendable. Information is given and translated in Arabic language which is the official language in the country. Familiar symbols are also used to emphasise the interpretation of the meanings of some sensitive information. The users are therefore at home with the information and are comfortable with it.

"*We understand our culture and the demands of the society and their information requirements; therefore we keep the standards that are nationally accepted and used nationwide*" [A3, User]

"*It is important that we speak the same language with the government and information is passed in a uniform manner. It helps remove the cost and other consequences of misunderstanding or misrepresenting information*" [A2, User]

"*Sometimes we experience some delays and incur some costs where we have to convert some information presented in units different from the units used by our international partners. Understandability is an essential characteristic of useful information. The lack of understandability complicates the realisation of our service. Providing non relevance information can lead to delaying our services and violate the people interest*" [A1, Provider]

Relevancy

Participants also highlighted the issue of the information produced being helpful in accomplishing the tasks needed to be done in the business of the organisation. Some

participants however argue that most of the information produced by the government is not relevant in their businesses and therefore not applicable.

> "*Sometimes the information we get is not relevant to not just our business but general businesses, the government sometimes try to create an information overload with junks of information to sift relevant information which is time consuming and costly to most businesses*" [A2, Provider]

5.6.3 Dependable Information

This sub-theme highlights the quality of information as a service provided by the government websites. The findings also confirm that participants were more concerned for the quality of information service in terms of the authenticity and security of the source of information, and the timely manner the information is released. In addition, the analysis revealed that Information Security is essential prerequisite for enabling e-Government. As seen by many interviewees, secure and timely sharing information is needed between the service providers and receivers to fulfil the fundamental security requirements: availability, integrity, confidentiality and control. Some of the interviewees correlated secure and timely information with cost reduction and ease of communication. Other interviewees linked between lack of security and increase in customers' complaints. Interviewees who worked at the managerial level see that both service providers and receiver are sharing the responsibility to ensure that adequate information security measures are in place.

Security

The fear of unauthorised filtering or provision of unauthorised, unconfirmed and modified information was highlighted in the study. Doubts were raised about the efficiency of the process of passing information from one government department to the other. The possibility of introducing unauthenticated information or withdrawing authentic information raises doubt about the dependability of the information presented.

> "*The attitude of some government officials and the information sharing approach/system adopted by the government does not convince some of us of the ability of government websites to provide secured and dependable information*" [A2, User]

"*The integrity of information we use in our daily business is of paramount concern to us, our competiveness in the industry depends very much on it, and we are therefore worried when we notice some lack of cooperation among government departments and some security lapses in the process of information sharing and processes*" [A3, Provider]

"*Privacy is a top concern for us. We need to be sure that personal data is safe and secure. We need also to access to the data from anywhere any time. It is also important to note that a secure system doesn't mean complex system. We need to access our information and services in an easy way without going through complicated process of security checks*"[A2, User]

"*Providing secure and dependable information is on the top of our priorities. Many of the problems and customers' complaints can be avoided by ensuring appropriate security measures and policies are in place. As information providers, we work to raise awareness about security issues by providing guidelines and suggestions to the information receivers on how to protect themselves from security breaches*" [A1, Provider]

Timeliness

Participants also agree that although the secured provision of information is important, but providing the information in its current state and in a timely manner gives the quality of dependability to the information. Again, some observed lack of cooperation among government departments may be slowing down the process and causing delays between the time information is received into the system and the time it is provided to the users.

"*We sometimes have received information that is stale and has lost its validity due to the time the event occurred and the time information gets to us*" [A1, User]

"*Time is of essence in our business that we rely on real-time information on events*"[A2, User]

5.6.4 Usable information

This sub-theme also concerns the service quality of information and highlights the perception of the users on the credible nature of the information, the reputation of the source and the provisions made to enhance easy and effective access to the information made available. Participants were more concerned with believability, accessibility and the value added capacity of the information. Participants opined that users prefer information when it is believable and reputable, as well as beneficial.

Believability

Most participants agree to an extent that the information provided by the government websites is true and credible in spite of some chances of infiltration of the system and unauthorised modification by unauthorised people. The perceived security of the system and the obvious efforts by the government to improve the quality of information convinces the participants of the credibility of the information and the source.

> "*The government's efforts and the introduction of state-of-art technologies have assured us and even the critics that we can believe the information we receive from the government*" [A2, User]

Accessibility

Another major concern is the ease of data attainability and the time aspect of accessibility. Participants indicate that the ability to get access to needed information when it is needed most makes the information most usable. Participants agree that the needed information is usually available and most times can be easily and quickly retrieved by any user at any time. The websites are considered to be well designed with guides and helps to enhance direction and fast access to information. The search engines have been of tremendous help to users in finding easy and fast access to needed information.

> "*The websites are effectively designed to fast-track access to information*" [A3, User]

> "*There is no restriction of access to any information put on the website; users are privileged to retrieve any information for use*" [A2, User]

Value added

Participants highlighted the satisfaction gained and expectations achieved as a result of the use of the information provided by the government websites. The quality of the information assisted users in meeting their obligations to their clients which helped in meeting targets and business objectives. Participants therefore confirm that the information used as provided was beneficial and added value to their businesses.

> "*We are satisfied with the quality of the information as it meets our expectations*" [A1, User]

> "*The information received from the government websites has helped a lot in facilitating our work and has helped to provide excellent services to our clients*" [A2, Manager]

Most participants also agree that providing added value information not only increases the use of e-Government, but also improves customers' satisfaction. Some interviewees who do not have managerial responsibilities found that accessibility and believability are important enabler to increase adoption of the e-Government services.

> "*I started using the online services because I found that they are easy to access and provide many services in one place. In addition, I found the e-Services portal user friendly and intuitive. Using the online services saves my time and I don't need now to wait for long time to be served*"[A3, User]

> "*Providing credible and useable information is very important aspect of our daily job. I think the credibility of the information source is critical to both service providers and receivers. Delivering credible information will boost the trust in the e-Government service.*" [A1, Provider]

> "*We do believe that providing value added services is essential to customer satisfaction. It also improves communication with our customers. Providing unbiased and credible information will be of enormous advantage not only to our customers, but also to our partners*" [A2, Manager]

5.7 Strategic Benefits Theme

This theme highlights the participants views on the benefits gained from the use of the government websites. The benefits are summed up in the cost savings achieved and the ease of the decision making process that enhanced agility and efficiency in the business organisations.

5.7.1 Costs

Participants are overwhelmed with the cost savings attributed to the quality of information provided by the government information services. The time taken to search for information from the various departments of government has been reduced to the barest minimum, which has also reduced the cost of information search and cost of doing business both with the government and the clients. The cost of obtaining information from other sources that were previously relied upon, has also been scrapped since participants now turn to the government services for more reliable and free information.

> "*We are glad the government information service has proved to be reliable and usable and as a result has saved businesses a lot of costs usually spent on information search*" [A1, Manager]

> "*The time delay usually experienced in the past when quantified is costly in terms of customer loss, overtime paid to staff, etc. The service provided by the government has indeed brought an end to such expensive time delays*" [A2, Manager]

5.7.2 Decision-Making

Good quality information has been able to simplify the decision making process of businesses. Participants finds it easy making good and quality decisions based on quality information that is readily available with unrestricted access. This has also enhanced business agility and efficiency in the ways businesses are conducted. Many interviewees link between information understandability and effective communications. Relevant information was identified by some interviewees as a necessary precondition for effective communications, while unbiased information recognised by many interviewees as an important driver of better decision-making.

"*Information interpretability plays an important role in e-Government services. Easy to understand information helps us to alleviate confusion about procedures to receive e-Government services and reduce the need for further inquiries*" [A1, User]

"*Understandability is an essential characteristic of useful information. The lack of understandability complicates the realisation of our service. Providing non relevance information can lead to delaying our services and violate the people interest"* [A3, Provider]

"*Inappropriate amount of information can cause ambiguity and misinterpretation for our employee and customers as well. We aim to deliver relevant and meaningful reliable information that drives better decisions. In addition, we believe that easy to understand information can enhance communications with our partners and clients*" [A2, Manager]

5.7.3 Service Quality

Sound information were seen by most participants as a prerequisite to provide timely and efficient services. The importance of sound information on strategic benefits was emphasized on multiple segments in the text. In addition, most participants went beyond the link between strategic benefit and information quality to demonstrate the relationship between sound information and organisational performance. Some participants stated that sound information can lead to an increase use of e-Government services. Other participants indicated that sound information can improve the institution's image. For example, a user and manager from organisations A1 and A2, respectively, reported that:

"*Complete information helps us to answer our customers' questions quickly and effectively. In the case of presence of errors in the information, this can lead to delay our works and required us to back to our mangers*" [A1, User]

"*Concise and consistent information is very important for our organisation. It helps both our employee and citizens to avoid misunderstanding and enable us to provide better services and deliver accurate and timely service to our citizens*" [A1, User]

5.8 Institutional Value Theme

5.8.1 Institutional Image

Most of the information users found that completeness and error free constructs are the most important aspect of sound information, which has the strongest effect on institution image. Some interviewees with management responsibilities found consistency the most important aspect of sound information and considered it as a key to develop a professional image for the organisations.

> "*Complete and errors free information is the most important characteristic of sound information, which affect the overall image of information providers. Incomplete information can delay or stop processing our orders. Information that has errors in it causes miss trust between the user and government organisations*" [A2, User]

> "*Providing concise and consistent information will not improve our institution image, but also helps reduce problem inquiries from our partners and customers. Concise and consistence representation supports systems integration between government organisations, and when we appear integrated it's better for our image*" [A3, Provider]

Appropriate amount and relevancy were seen by many interviewees as key qualities of useful information, which influence institution image. Most of the information users correlated interpretability with ability of tracking and checking the states of e-Government services. Information managers and providers shared the same view in that relevant information is very important to organisations to save time and resources.

> "*I think interpretability and appropriate amount of information are the key attribute of useful information. Interpretability and appropriate amount make it easy to track and follow the status of our requests and orders and this* clearly expressing the organisation image" [A3, user]

> "*Useful information is one that is relevant to the jobs in our hand. Irrelevant information can delay our work and required us to spend more time in checking the information and identify which is needed and which is not*" [A2, provider]

Learning new services and participating in community activities were among the new codes emerged under this sub-theme. Most of the interview found that getting updated information is very essential for the image of any organisation. Information users claimed that the availability of updated information encouraged them to learn about new services and participate in community activities. Most of the information managers found security issues is the key attribute of dependable information, which can affect the whole organisation image. However, they affirmed that establishing and maintain adequate security measures are the responsibility of the whole community.

> "*Online services are easier than traditional on-premises services. The availability of updated information encourages me to learn more about new service and to participate in community activities*" [A1, User]

> "*Security issues play major role in shaping our institutional image. We work with our partners, providers and customers to ensure that adequate security measures are established and maintained. Access authority is well defined in our organisation, and it provides us as managers a piece of mind especially in the case of sensitive information and increases our credibility in front of users and citizens*" [A3, Manager]

There were clear differences among the information sharing participants. On the one hand, Information users found that accessibility and ease of manipulation are the most influencing parameters of usable information. On the other hand, information provider found that value added is the most important factor of usable information and the most influential factor on institutional image. Information mangers agreed with providers in that value added is very important aspect of usable information. In addition, they found easy to understand is another important feature of usable information and linked it with the increase use of e-Government.

> "*Accessibility and ease of manipulation are required in order to be able to obtain usable information, which can increase the use of e-Government services. In addition, getting value added information is a gateway to increase engagement with community activities and enhance the image of the organisation*" [A3, User]

> "*Usable information should be easy to understand and provide added value to information receiver. Increase e-Government services take-up is attainable through providing added value information and services*" [A2, Manager]

5.8.2 Credibility

The code analysis under this Sub-theme revealed that in order to maintain the credibility of an organisation and to gain citizens trust, it is essential to deliver sound information. More specifically, some of the participants considered consistency and error free as a proxy for professionalism which in turn helps improve citizen retention and promotes the credibility of the organisation.

> "*Sound Information creates confidence and respect to the work of government and enhance government image with employees and citizens. Consistency is a proxy for professionalism, which in turn helps to strengthen the institution's image. Error free information is also important to building credibility in our services*" [A2, Manager]

Participants were concerned about providing relevant and appropriate amount of information because this can reduce citizens' problems and complains and improve the organisational credibility.

> "*Useful information should be appropriate in amount and relevant to ensure that it can be used to make informed decisions. Providing irrelevant information can confuse the services receivers and can damage the credibility and the image of any organisation*" [A1, Manager]

In addition to sound and useful information, participants agreed that the availability of information and services is essential for building trust and credibility. Most of the participants have agreed on that outdated information can confuse citizens and can cost organisations money because poor decisions are made based on the incorrect information.

> "*The availability of updated information is very important for building trust and credibility in our services. Outdated information not only affects our overall image, but also reflects on the quality of our service. Information that comes on time helps employees do their assigned jobs and allow for services to be introduced which in turn provides confidence and credibility in e-Government*" [A2, Provider]

Security issues were among the top concerns for many participants. They stressed the need to put solid security measures in place. Awareness of the security problems were raised among the participants.

"*Information Security it is important for our citizens to be assured that their information is secure and remains private. Information security incidents can occur if the confidentiality, availability or integrity of any personal data have been compromised. It is a whole community responsibility to ensure that adequate information security measures are being taken. From our end, we strive to improve our information security management systems by addressing technology, processes and human resources at the same time. Adopting this strategy resulted in cost savings by avoiding problems before they occur*" [A3, Manager]

5.9 Differences among Information Sharing Participants

The comparison of code groups across different information sharing participants revealed two main differences: a) the perspective of the information sharing participants on the most important characteristics of information quality, and b) the time when the information quality benefits can be expected. Table 5.24 illustrates four dimensions of information quality considered in this research. Moreover, a list of the most important characteristics of these dimensions grouped by the roles of information sharing participants.

	Users	Providers	Managers
Sound Information	Completeness	Concise and Consistent Representation	Concise and Consistent Representation
Dependable Information	Security and Timeliness	Security and Timeliness	Security and Timeliness
Useful Information	Interpretability	Understandability	Relevancy
Usable Information	Accessibility, Ease of Manipulation	Ease of Manipulation and Value added	Value added

Table 5.24: Dimensions of Information Quality Grouped by the Roles of Information Sharing Participants

As can be seen form Table 5:24, on one hand, information users are more concerned about the attributes of information quality that can help them to complete their daily tasks and jobs. One the other hand, providers and managers are more concerned about the attributes that provide strategic advantages to e-Government services. For example, users valued accessibility and ease of manipulation over value added which was favoured by managers and provides. The quotes below provide some examples that demonstrate these differences between the information sharing participants. For example, users and manager from organisations A3, A1 and A2, respectively, reported that:

> "*I started using the online services because I found that they are easy to access and provide many services in one place. In addition, I found the e-Services portal user friendly and intuitive. Using the online services saves my time and I don't need now to wait for long time to be served*" [A3, User]

> "*Complete information helps us to answer our customers' questions quickly and effectively. In the case of presence of errors in the information, this can lead to delay our works and required us to back to our mangers*" [A1, User]

> "*We do believe that providing value added services is essential to customer satisfaction. It also improves communication with our customers. Providing unbiased and credible information will be of enormous advantage not only to our customers, but also to our partners*" [A2, Manager]

As can be seen from the above quotation, information users were expecting quick and individual benefits form quality information, while managers were more interested in organisational benefits, which obviously take time to materialise. Information users stated that quality information empowered them and gave them the ability to exert more control over their job duties and minimised the needs to receive detailed instructions from their managers. In contrast, information managers had a long-term view of the benefits expected from quality information. They stated that quality information can improve decision-making process, enhance efficiency, and help organisations to improve their communications with their customers and partners.

5.10 Additional Benefits of Quality Information

Further thematic analysis also revealed other benefits of quality information on e-Government services. Some of these benefits represent almost purely individual gains such as personalisation, convenience, control and time saving. Other benefits are extended to the whole organisation, including better decision support, reengineered business processes and cost saving. Although individual benefits may be small, the potential benefits for the organisations are huge.

Moreover, there are also intangible benefits, which may impact organisational images and reputation such as enhancing transparency and reducing bureaucracy. The quotes below support this insight and provide some of the additional benefits of quality information. For example, managers from organisations A1 and A3, respectively, reported that:

> "*Useful information should be appropriate in amount and relevant to ensure that it can be used to make informed decisions. Providing irrelevant information can confuse the services receivers and can damage the credibility and the image of any organisation*" [A1, Manager]

> "*From our end, we strive to improve our information security management systems by addressing technology, processes and human resources at the same time. Adopting this strategy resulted in cost savings by avoiding problems before they occur*" [A3, Manager]

Individuals without people management responsibilities stated that quality information enabled them to tailor the delivery of the e-Government services towards their personal needs. They also have the same view as of managers i.e. quality information is associated with convenience as it increases the ability to receive governmental services as and when they want them. However, it is worthy of note that convenience is related to the accessibility attributes of useful information dimension. This gives an example of mixed understanding of some interviewees on the difference between quality information attributes and expected benefits of quality information. Nonetheless, this does not diminish the value of thematic analysis; rather, it contributes to rise and highlights some issues not been considered in the quantitative analysis, in addition to explore those issues already discussed in the quantitative analysis.

5.11 Challenges to the Benefits of Quality Information

Although the majority of interviewee recognised the benefits of quality information, they also noted some issues which may limit the benefits derived out from quality information. On the top of these issues are cultural and social influences. Other complicating factors that may hinder the benefits includes: lack of expertise and resistance to change. For example, managers from organisations A1 and A3, respectively, reported that:

> "*I think our society needs to know more about e-Government. If you ask anybody in the street, you will find the majority have no idea about it. Therefore, I think we need to raise the awareness about it before realise the benefits of e-Government*" [A1, Manager]

> "*Connections (Wasta) in our society have a hidden force. Even though, we have resources to reap the full advantages of e-Government Wasta plays a major role in hindering e-Government initiatives*" [A3, Manager]

> "*Lack of expertise sometimes leads citizens to not access services when they need them. Lack of in-house technical expertise can potentially create difficulties and lead to costly solutions. Staff resistance to changes can also pose a significant threat to our e-Government projects*" [A3, Manager]

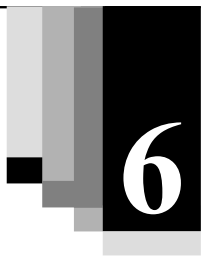
Cultural and social influences were seen by many of the interviewees as significant stimulus, which may have varied positive or negative effects on e-Government adoption. Some of the interviewee stated that they started using e-Government services because they saw their colleges using them. In contrast, other interviewee noted that they don't have the expertise to use the e-Government services and they have not been encouraged to use or helped on how to use these services.

5.12 Summary

This chapter has presented an in-depth analysis of the quantitative and qualitative data collected from the distributed questioners and the semi-structured interviews. The chapter explained the processes and steps which were taken in order to analysis the collected data. In addition, it presented the main results and findings of both qualitative and quantitative analysis. The qualitative analysis presented and explained the analysis findings of the twelve (12) hypotheses that formulated to explore and explain the relationships between the variables covered in this study. These findings supported all twelve hypothesis and revealed statistical significant evidences that there are positive and constructive relationships between information quality, strategic benefits, institutional values from one side and the organisation performance from the other side. These relationships are systematically measurable and can be used to predict organisation benefits and performance.

Results from the qualitative analysis complement those from the quantitative analysis and provide more informative and complete picture of the issues raised in this research.

The qualitative and quantitative analyses results were in good agreement. The next chapter discusses the results presented in this chapter in conjunction with the relevant literature in order to verify and validate these results and to draw meaningful and valid conclusions.



Chapter 6: Discussions

6.1 Introduction

Previous chapter presented results and findings of the qualitative and quantitative analysis. This chapter provides in-depth explanation and interpretation of the research findings. The chapter also provides an overview of why and how information quality affects strategic benefits and institutional value and ultimately institutional performance. In addition, this chapter presents a synthesis and interpretation of the relevant literature in relation to findings of this research. Moreover, this chapter applies a triangulation approach by relating the results of both qualitative and quantitative analyses to each other. This chapter starts by discussing the results of the hypothetical relationships raised in Chapter 3, reassures the research conceptual IQBP model, and proves the relative relationships amongst the research variables and constructs. This is along with comparison with the literature to assess the validity and equivalence of the research results and findings. The chapter then on discusses further issues, which have emerged during the qualitative analysis. These issues are either other benefits of information quality or challenging factors affecting the relationships between information quality and institutional performance. Next, this chapter revisits the research model proposed in Figure 3.6 and presents a revised version of the model. The revised model includes new factors derived from the empirical research – these new factors have been found to positively affect institutional performance.

6.2 Discussion and Triangulation – Synthesising Results of Quantitative and Qualitative Analysis

As illustrated in Chapter 2, a considerable amount of literature is published on information quality dimensions and assessments (e.g. Wang and Strong 1996; Kahn et al., 2002; Lee et al., 2002), organisational performance assessment (e.g. ShengandMykytyn, 2002; Barki and Pinsonneault, 2005) and e-Government benefits (e.g. Jaeger 2003; Gilbert and Littleboy, 2004; Shim and Eom, 2008). There is also a growing body of literature that focuses on the relationships between information quality and organisational performance (e.g. Batiniet *el al.,*

2009; Kerr and Norris, 2004). However, detailed explanation of these relationships is either non-existent or insufficient (Jaklic, 2011). Only few studies discussed the direct connection between information quality and organisational performance. For instance, Campbell *et al.,* (2004) investigated the linkage between information strategy and organisational performance and demonstrated that there is a positive link between information quality and organisational performance by calculating the return on investment. This conclusion is also supported by the findings of the cost-benefit analysis conducted by Kerr and Norris (2004).

Slone (2006) conducted a comprehensive study of these links and noted that the organisational performance can be can be improved by focusing on information quality. Although the aforementioned studies contributed greatly in developing an understanding of the impact of the information quality on organisational performance, they did not offer answers to the questions of how and why information quality affects organisational performance. Having highlighted some limitations of the literature to date, this research fills the gap in understanding of the relationships between information quality and organisational performance. Consequently, this research investigated the organisational impact of information quality, using a research instrument and model for information quality called IQ/PSP developed by (Kahn *et al.,* 2002), and an instrument called IS Success Model proposed by Delone and McLean (2003) to measure organisational performance.

As described in Chapter 4, this research had two phases of data collection and analysis. Phase one adopted a quantitative approach to collect data by questionnaires, while phase two adopted a qualitative approach to collect data through a series of semi-structured interviews. In phase one, the aim was to reach as broad a population as possible to cover a reasonable and reliable sample. In contrast, phase two focused on acquiring an in-depth explanation and understanding on the relationships between research variables. In addition, phase two sought to verify and confirm statistical findings of phase one. In this section, the synthesis results of the two phases are presented and discussed. Utilising qualitative and quantitative methods occurs in all research stages, including designing and developing the questioner and the semi-structure interview, data collection and data analysis. Then the qualitative and quantitative results are combined to provide an overall view for the outcomes of this research. The combination process is based on triangulation methodology, which is performed by finding convergence, corroboration, correspondence between quantitative and quantitative results. The combination process also seeks elaboration and clarification of the results in addition to expand the breadth and range of research enquiries.

The discussions of the results were structured under four sections corresponding to each concept investigated in this research. The first two sub-sections discussed the impact of information quality on strategic benefits and organisational value. The next sub-section investigated the differences in the views of information sharing participants. The last sub-section explored the relationships between strategic benefits, institutional value and organisational performance.

6.1.1 Strategic Benefits for Information Quality

Findings from the analysis of *H1* suggested a moderate and positive relationship between sound information and strategic benefits. Concise and consistent representations were among the top attributes of sound information, which affect strategic benefits and they are both accounted for 61.3% of the variance in strategic benefits. The qualitative analysis revealed differences among information sharing participants in regard to the most important characteristics of sound information. These differences were discussed in details in Section 6.1.3, but in general, many of the interviewees found that concise and consistent representations are very important attributes of sound information. The qualitative analysis provided some insights on why sound information is an important enabler for e-Government strategic benefits. Based on this analysis, sound information is essential to provide timely and accurate information, which in turn leads to quick reaction to users' needs. These findings are consistent with findings of Campbell *et al.,* (2004) who found that accuracy can positively affect organisation's ability to respond quickly to customers' needs.

Likewise, the analysis of *H2* indicated a moderate and positive relationship between dependable information and strategic benefits. Based on this analysis, timeliness is the only dimension found to be associated with strategic and accounted for 63.9% of the variance in it. The qualitative analysis revealed agreement among different information participants on that security is the most important aspect of dependable information, which has influence on strategic benefits. There was also agreement among interviewees on that information security is essential prerequisite for enabling e-Government. This agrees with e-Government literature, where security and privacy have been cited frequently as a barrier to the development of e-Government (Sanchez *et al.,* 2003; Lambrinoudakis *et al.,* 2003). Not surprisingly, the qualitative analysis of dependability questions revealed a deeper insight into the characteristics of dependable information. One of the interviewees with management responsibility provided detailed description of secure information and said that "secure and timely sharing information is needed between the service providers and

receivers to fulfil the fundamental security requirements: availability, integrity, confidentiality and control".

In terms of explanation for why information security influences strategic benefits, some of the interviewees correlated secure information with cost reduction. Other interviewees linked between lack of security and increase in customers' complaints, which obviously result in substantial increase of costs to deal with these complaints. Similar to *H1* and *H2*, the analysis of *H3* revealed a moderate and positive correlation between usefulness of information and strategic benefits. Interpretability, appropriate amount and relevancy were identified as the key influencers on strategic benefits and accounted for 71.50% of the variance in it. In addition to interpretability, appropriate amount and relevancy, the qualitative analysis added understandability to the list of key influencers. Some of the interviewees with management responsibility stated that understandability enables better decision-making.

The analysis of *H4* revealed a positive relationship between usable information and strategic benefits, where value-added and ease of use were the two top influencers in this relationship and they both accounted for 75.5% of the variance in strategic benefits. The qualitative analysis presented similar results, where the majority of the interviewees identified value-added and ease of use as the most important characteristics of usable information. Similar to useful information, most of the interviewees have linked between usable information and enhancing communications with partners and citizens. The similarity between these findings and the views found in the literature both provide validation for these finding. Tsakonas *et al.,* (2006) found that usability and usefulness are interconnected attributes and users do not find discriminating differences between them. This fact can explain the similarities in the views of interviewees in that useable and useful information enhance communications with partners and citizens.

To summarise, the qualitative and quantitative analyses of the relationships between quality information and strategic benefits were in upright agreement. They both revealed positive and significant relationships between information quality attributes and strategic benefits. Figure 6.1 illustrates these relationships by showing r-squared coefficients and p-values. As expected and in consistence with the conceptual IQBP model in Figure 3.1, all the coefficients are significant and positive at either the five per cent or the one per cent level. As can be seen in Figure 6.1, usability comes on the top of the key influencers on strategic benefits with r-squared value of .755 followed by r-squared values of .715, .639 and .613 for usefulness, dependability and soundness, respectively. As can be seen from these results, usability and usefulness have been identified by the majority of the research participants as the key

characteristics of high quality information. Many of these participants revealed that they most concern about system usability and usefulness because this enable them to answer questions and perform functions relevant to their job duties.

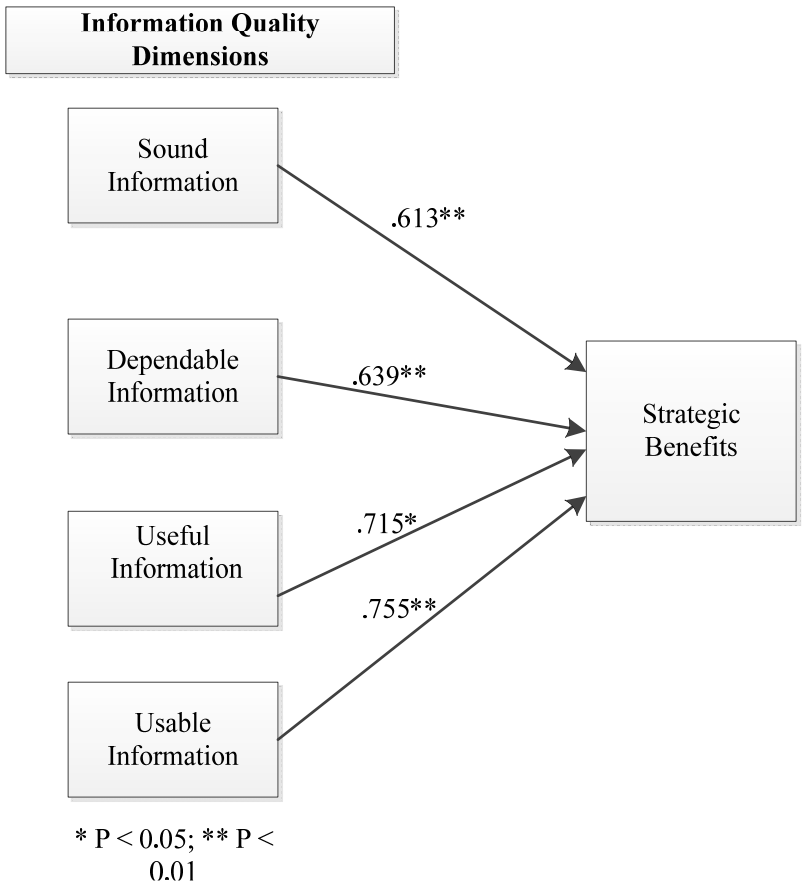


Figure 6.1: Validating Relationships between Information Quality and Strategic Benefits

Based on the qualitative analysis Figure 6.2 shows the links between the attributes of information quality constructs (soundness, dependability, usability and usefulness) and the strategic benefits elements described in Section 3.4.2. As presented in Figure 6.2, sound information enables quick reactions to meet citizens' needs. Dependable information can help to reduce costs and improve services quality. It is worth to mention that cost saving is a new element of strategic benefits, which has been emerged through the qualitative analysis. Useful information enables ease of communication with and among different e-Government agencies as well as with citizens.

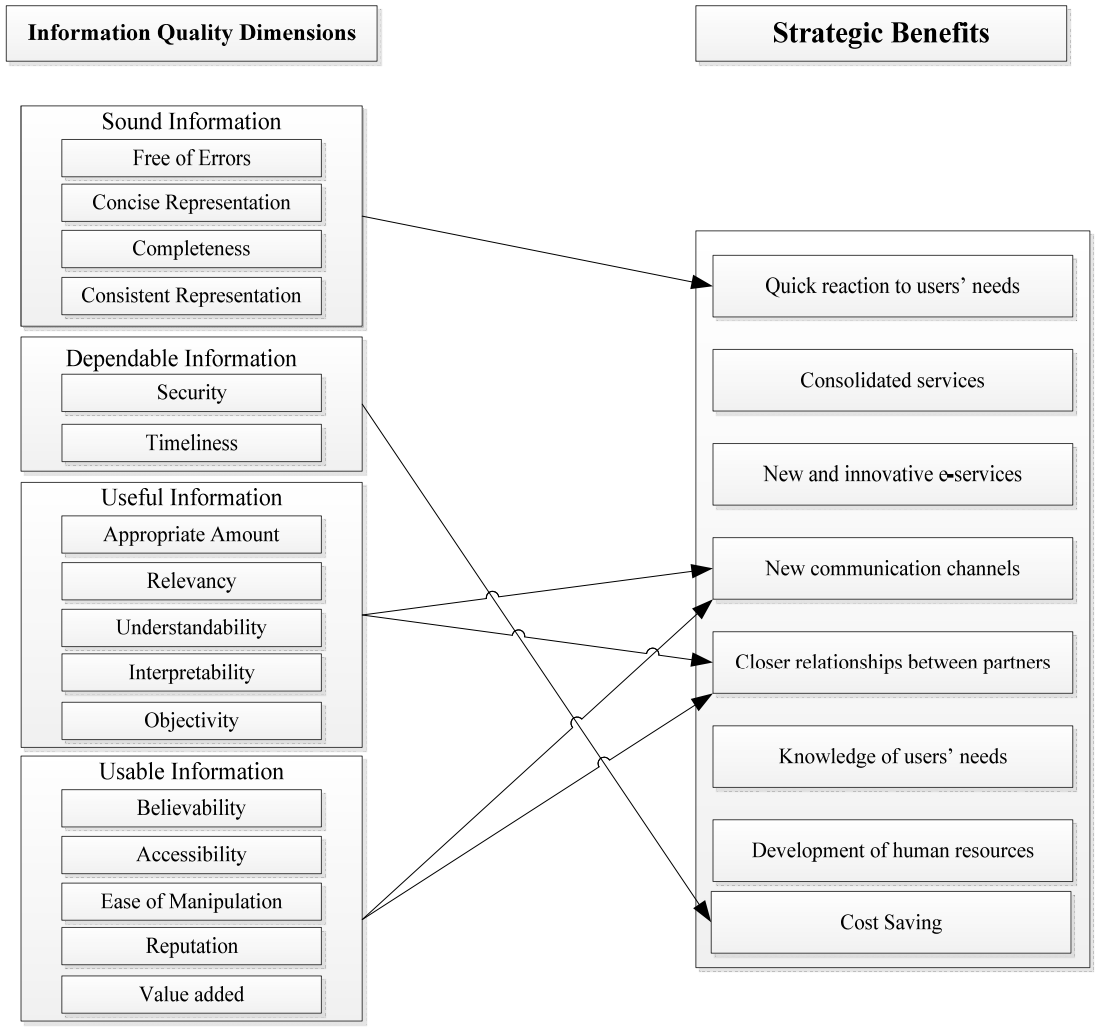


Figure 6.2: Relationships between Information Quality Attributes and Strategic Benefits Constructs

6.1.2 Institutional Value of Information Quality

The analysis of *H5* revealed that improvements in the soundness of information can increase institutional value. Concise and free of error were the two characteristics of sound information, which have the strongest effect on institutional value and they both accounted for 60.10% of the variation in it. The qualitative analysis added completeness to list of the characteristics that affects institutional value. As noted by three of the interviewees, these characteristics are vital to credibility of organisations and to strengthen their professional image. This because incomplete information can delay or stop processing e-Government transactions, which in turn can cause miss-trust over the public. This corresponds with the literature findings those points out that sound information exerts a greater influence on organisational image and credibility (Nguyen, 2001).

Unlike *H2*, the analysis of *H6* asserted that both timeliness and security dimensions are important aspect of dependable information and have a statistically significant influence on institutional value, where they accounted for 67.7% of the variation in it. Likewise, the qualitative analysis asserted that both timeliness and security have become a priority for organisations because they not only affect the quality of e-Government services but the whole institutional image as well. In recent years, a number of reports literature findings have highlighted the relation between dependable information and organisational credibility and image (e.g. Shih and Li, 2006; Headayetullah and Pradhan, 2010).

The qualitative analysis also uncovered very interesting insights into the relationships between dependable information and institutional value. In addition to enhancing organisation credibility and image, dependable information is a key enabler for community commitment and active participation in e-Government services. Such findings concur with literature stressing the influence of dependable information on community commitment and loyalty (e.g. Jang *et al.,* 2008). The analysis of H7 revealed a moderate and positive relationship between useful information and institutional value. Similar to *H3*, interpretability, appropriate amount and relevancy were identified as the key influencers on institutional value and accounted for 67.70% of the variance in it. In contrast, the qualitative analysis asserted that appropriate amount and relevancy are the most important characteristics of useful information that affects institutional value. Most of the interviews emphasised that relevance and appropriate amount of information make it easy to track and monitor e-Government services, which reflects directly on institutional value.

The analysis of *H8* revealed that improvements in the usability of information will increase institutional value. Value-added, ease of use and believability were identified as the most important attributes of usable information which have a statistically significant influence on institutional value, where they are accounted for 72.50% of the variation in institutional value. Similar to *H1*, the qualitative analysis revealed differences among information sharing participants in regard to the most important characteristics of usable information. However, most of the interviewees have agreed that increase in e-Government services take-up is attainable through providing usable information. This is consistent with e-Government literature which identified information usability as a key barrier to the e-Government adoption (e.g. Gilbert and Littleboy 2004; Ebrahim and Irani, 2005).

To summarise, the qualitative and quantitative analyses support the hypothesized relationships between information quality and institutional value. Figure 6.3 illustrates these relationships by showing r-squared coefficients and p-values. As expected and in consistence

with the conceptual IQBP model in Figure 3.1, all the coefficients are significant and positive at either the five per cent or the one per cent level.

As can be seen in Figure 6.3, usability comes on the top of the key influencers on institutional value with r-squared value of .725 followed by r-squared values of .677, .61 and .601 for usefulness, dependability and soundness, respectively. Interestingly, the same ranking of information quality attributes was also observed in the relationships between information quality and strategic benefits.

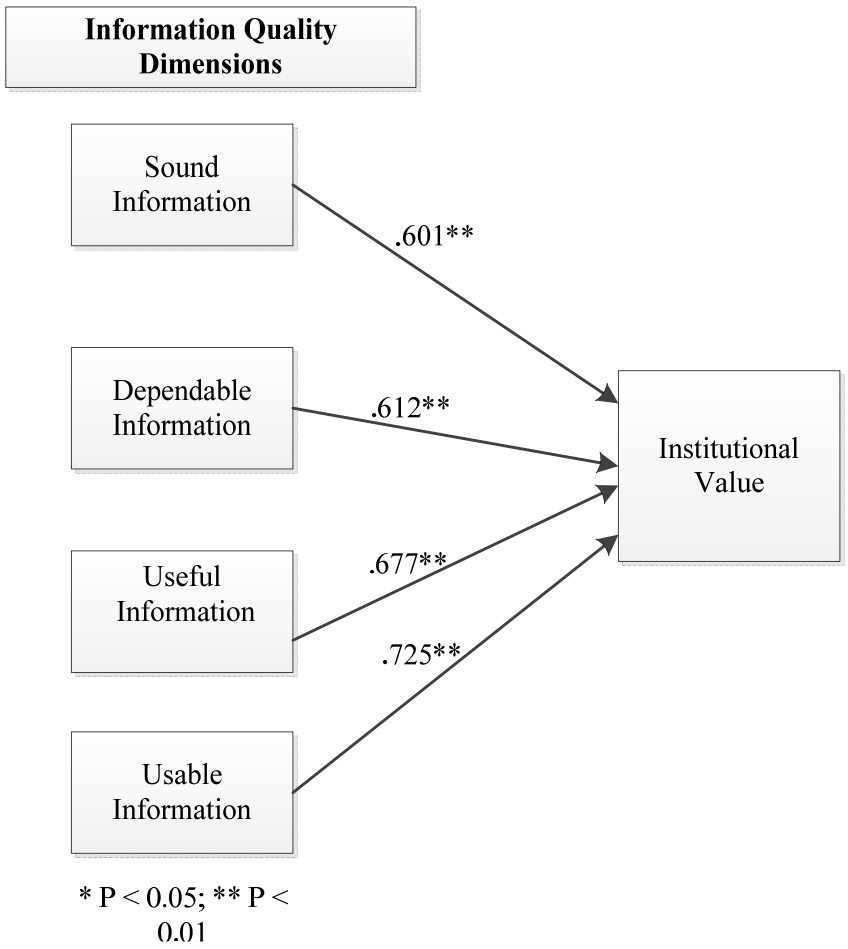


Figure 6.3: Validating Relationships between Information Quality and Institutional Value

Based on the qualitative analysis Figure 6.4 shows the links between the attributes of information quality constructs (soundness, dependability, usability and usefulness) and the intuitional value elements described in Section 3.4.3. As can be seen in Figure 6.4, sound information linked with organisation's credibility and image. Dependable information can promote and sustain the adoption of e-Government through active participation and

community commitments. Useful information enables tracking and inspection of e-Government services.

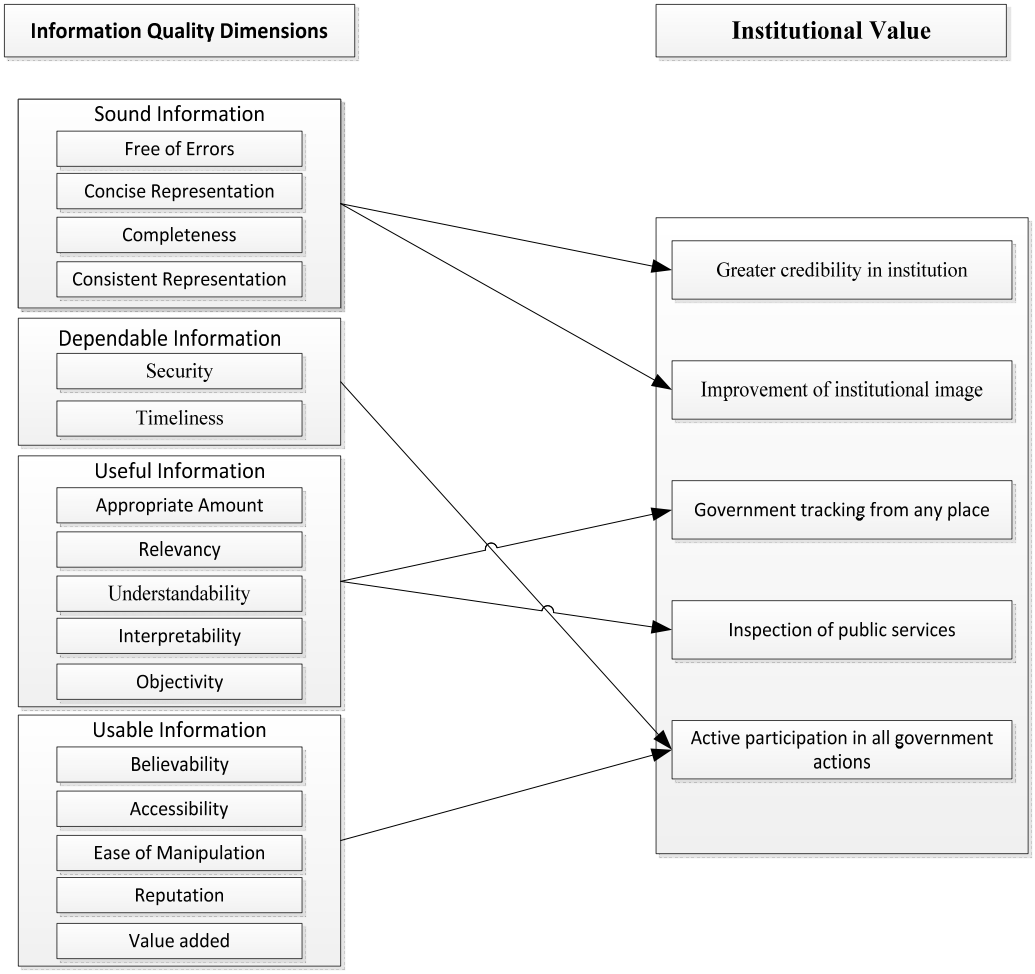


Figure 6.4: Relationships between Information Quality Attributes and Institutional Value Constructs

6.1.3 Differences amongst Participants' Views

Both quantitative and qualitative analyses showed some differences among information sharing participants' views regarding the relationship between information quality and strategic benefits. The analysis of *H9* revealed that the difference in participants' views was more than 62.5%. The qualitative analysis confirmed the presence of these differences and revealed some insights into why these differences exist. Table 6.1 highlights the dimensions of information quality grouped by the roles of information sharing participants and the analysis method. Similarly, quantitative and qualitative analyses were in agreement and presented some differences regarding the relationship between information quality and institutional value. The analysis of *H10* revealed that 68.75% of the differences in participants' views were due to the information sharing participant roles. These

results confirm the findings of Santos et al., (2010), who noted that individual roles significantly change the perception of individuals regarding information quality. These results were also in agreement with Lee's et al., (2002) findings, which suggested that the role of stakeholder might significantly influence the assessments of information quality.

As highlighted in Table 6.1, the triangulation of quantitative and qualitative methods applied in this research shows a positive cross-validation among the two methods. Not only the results and findings of quantitative analysis were confirmed and thoroughly explained through qualitative analysis, but also the qualitative analysis provided detailed insights that would otherwise not have been possible by using the quantitative analysis only. Some differences in results are expected in research applying methods triangulation. However, this does not affect the validity and reliability of the major findings resulted from the two methods.

		Soundness	Dependable	Useful	Usable
Users	**Quantitative**	✓Concise Representation	✓Timeliness	✓Interpretability ✓Appropriate amount	✓Value added ✓Ease of Manipulation ✓Accessibility
	Qualitative	✓Completeness	✓Security ✓Timeliness	✓Interpretability	✓Accessibility ✓Ease of Manipulation
Providers	**Quantitative**	✓Concise Representation ✓Consistent Representation	✓Timeliness	✓Relevancy	✓Value added
	Qualitative	✓Concise and Consistent Representation	✓Security ✓Timeliness	✓Understandability	✓Ease of Manipulation ✓Value added
Managers	**Quantitative**	✓Concise Representation	✓Timeliness	✓Appropriate amount	✓Value added
	Qualitative	✓Concise and Consistent Representation	✓Security ✓Timeliness	✓Relevancy	✓Value added

Table 6.1: Dimensions of Information Quality Grouped by the Analysis Method and the Roles of Information Sharing Participants

The qualitative analysis revealed some interesting insights that explained the differences among the perspective of the information sharing participants regarding the most important characteristics of information quality. Information users were more concerned about the attributes of information quality that can help them to complete their daily tasks and jobs; while employees with managerial responsibilities were more concerned about the attributes that provided strategic advantages to e-Government services. For example, users valued accessibility and ease of use over value added which was favoured by managers and provides.

6.1.4 Impact of Strategic Benefits and Institutional Value on Organisational Performance

The analysis of *H11* revealed a strong and positive relationship between strategic benefits elements identified in Section 3.5 and organisational performance. All these elements except new and innovative e-Services were accounted for 87.50% of the variation in organisational performance. On one hand, consolidated services, knowledge of users' needs, communication channels, and quick reaction to users' needs and links with partners were ranked as the strongest factors contributing to organisational performance. On the other hand, development of human resources and introducing new and innovative e-Services were excluded from the list of factors which affect organisational performance. The exclusion of new and innovative e-Services can be explained by the fact that the research participants were government workers and they were more concerned about getting reliable and usable services, which help them to execute their job duties more efficiently than innovative ones. Not surprisingly, the qualitative analysis added one of the excluded factors, which is introducing new and innovative e-Services. In addition, the qualitative analysis identified another three elements of strategic benefits which have not been investigated in the quantitative analysis. The three elements are *(a)* cost saving; *(b)* enhance decision-making process; and *(c)* improve citizen satisfaction. In the same line, previous studies has shown that there is a positive relationship between information quality and cost saving and this relationship, in turn, contribute to enhance organisational performance (Campbell et al., 2004; Kerr and Norris, 2004). Likewise, Glora et al., (2010) asserted that quality information is a key to better decision-making, which leads directly to improve organisational performance. McKinney et al., (2002) and Teo et al., (2008), (Freed, 2012) assured the effect of information quality on customer satisfactions and organisational performance.

As expected, some interesting insights also emerged from the qualitative analysis concerning the relationships between strategic benefits and organisational performance. These insights are centred on the explanation of how the improvement in various aspects of the strategic benefits can lead to increase the organisational performance. Some of the interviewees noted that introducing new and innovative e-Services can improve organisational performance. In addition, many of the interviewees go beyond the link between information quality and strategic benefit to demonstrate the relationship between usable information and organisational performance. For instance, interviewees stated that usable information can lead to an increase use of e-Government services. This finding was in consistence with the quantitative analysis results, which ranked usable information as the most influential attribute of information quality on strategic benefits and consequently on organisational performance.

As with *H11*, the analysis of *H12* revealed a strong and positive relationship between institutional value elements described in Section 3.6 and organisational performance. The analysis showed that institutional value elements were accounted for 88.4% of the variation in organisation performance. This high percentage emphasizes the importance of improving various aspects of institutional value in order to increase organisation's performance. Improvement of institutional image, constant control of action, ability of inspection of public services and institutional credibility were the most influential elements of institutional image, respectively. In addition, the quantitative analysis revealed that active participation in all government actions had no effect on organisational performance.

The qualitative analysis confirmed the strong relationship between all institutional value elements, including active participation in all government tiers, and institutional performance. As seen by many interviewees, improvement in institutional image and credibility can greatly increases organisational performance. This is because the organisations will reduce the need to devote their resources to establish their image and credibility and will make these resources available for more productive purposes. The qualitative analysis also explained further on the relationships between information quality and organisation performance. Most of the interviewees have agreed on that information, which is highly regarded in terms of its source or content is very crucial for the organisation image and credibility. In other words, usable information is very important to maintain the professional image of the organisation and to increase use of e-Government services. This finding was in agreement with the quantitative analysis results, which identified usable information as the most important attribute of information quality which affect organisational performance. Van *et al.,* (2004) and Gefen and Straub (2000) showed that usable information have clear implications on the image of the organisation and impact the intentions of users towards using e-Services.

6.2 Discussion on Further Issues Arising from this Research

As with any study, this research encountered some difficulties and limitations. These limitations can be summarised into five broad categories:

6.2.1 Additional Benefits of Quality Information

As discussed in Section 5.5.5.3, there are some strategic benefits of information quality which emerged during the qualitative analysis. Based on this analysis, cost saving, increase citizens' satisfaction and enhance decision-making process were the most important benefits identified by the participants in this research. Cost saving is realised by utilising organisational

resources to improve their performance rather than to fix the problems of poor quality information. One of the interviewees with managerial responsibilities stated that "*they had seen substantial cost saving because they adopted a proactive strategy to information quality, which enables them to avoid problems before they occur*". Other interviewees noted that poor quality information not only incurs extra cost, but also can damage the credibility and the image of any organisation. This finding clearly illustrates link between strategic benefits and institutional value because organisational image and credibility are the two most important attributes of institutional image.

The author believes that this link is a bidirectional relationship because both sides of the relationship have effects to the other side. For instance, quick reaction to users' needs, an element of strategic benefits, can lead to improved organisational image and credibility, which in turn can create closer relationships with partners and citizens. Various studies have pointed out that quality information is important for cost saving and efficiency in e-Government operation (e.g. Redman, 1998; Bertot *et al.,* 2008). Other studies reported cost saving as one of the key benefits of e-Government in general (e.g. Jaeger 2003; Gilbert and Littleboy, 2004; Shim and Eom, 2008). This research supports the growing body of literature that identified cost saving as a key benefit of e-Government. However, this research is different in that it focuses on the impact of information quality on e-Government. To this end, the findings of the qualitative analysis revealed a strong and positive relationship between information quality and cost saving. These findings also help to further explain the relationship between improving information quality and cost saving.

The qualitative analysis revealed that quality information can increase job satisfaction. Most of the interviewees stated that they are expecting quick and individual benefits form quality information. Some of the interviewees asserted that quality information empowered them and provided them with ability to exert more control over their job duties. As the focus in this research is on the perspective of different information sharing participants in e-Government, most of the interviewees' views were concerned about the insider benefits of information quality. However, the main aim of this research is to investigate the net benefits of information quality, which obviously extended to cover information sharing participants and citizens as well. Having this in mind, citizen satisfaction was one of the new benefits of information quality which emerged through the qualitative analysis. Some of the interviewees not only linked between information quality and citizen satisfaction, but also they attribute increase e-Government use to citizens' satisfaction.

Gupta and Jana (2003) identified poor quality information as the major causes of citizen dissatisfaction. In the same line, a detailed examination of citizen satisfaction by Welch *et al.,* (2005) showed that citizen satisfaction is determined by the citizen-perceived level of information quality. The findings of this research are consistent with the two previous studies in highlighting the importance of information quality for citizen satisfaction. In addition, these findings showed that the effect of information quality is expanded beyond citizen satisfaction to affect the organisational performance by increasing use of e-Government.

Enhance decision-making is one of the information quality benefits which have been noted frequently by many of interviewees. They asserted that there is a positive relationship between information quality and decision-making quality, with a consequent relationship with organisational performance. Information quality affects the decision-making process of all information sharing participants. The qualitative analysis demonstrated further how quality information can improve decision-making process for different information sharing participants. For example, information users stated that they need accessible and understandable information to make informed decisions. Information provider noted that they need relevant and appropriate amount of information to make sound judgment on all aspects that affect the quality of the services provided. Information managers asserted that they need concise and timeliness information to make high quality decisions.

The relationship between information quality and decision-making is well established and has been the subject of extensive research (Jung *et al.,* 2005). Studies in this area investigate the impact of information quality on organisational performance and assess the impact of information quality on decision-making. As suggested by Redman (1998), poor information quality can impair organisational performance because of its influence on decisions made. The impact of information quality on decision-making has been investigated in several studies (e.g. Raghunathan, 1999; Fisher *et al.,* 2003; Jung *et al.,* 2005). The literature provided also many examples to demonstrate the impact of poor information quality on the decision-making. Financial losses and citizen dissatisfaction were some of the serious consequences which might result from poor quality data. One example of catastrophic consequences of poor quality information is the case of hospital staff who misplaced a decimal point which allowed a fatal overdose to be administered to paediatric patients (Belkin, 2004).

6.3 Challenges to the Benefits of Quality Information

Although most of the interviewees recognised the benefits of information quality, both at the individual and institutional level, they acknowledged some of the challenges and barriers

which may limit the potential for positive outcomes of information quality. On the top of these challenges and barriers were cultural and social influences, lack of expertise and resistance to change.

6.3.1 Organisational Challenges in Kuwait

Kuwait's social organisation is predominantly tribal in nature where tribal and religious norms govern relationships among people including business and work relationships. The tribal system in Kuwait affects the role of individuals, which is reflected in the operational ethos and values of an organisation. Kuwaitis depend heavily on personal and family connections "Wasta" to get work done. Wasta defined by Loewe *et al.,* (2007) as the act of asking for or benefiting from preferential treatment instead of going through official channels. Nepotism is another word for Wasta and can be defined as favouritism granted to relatives or friends regardless of merit. A good example of Wasta acts is the intervention on an individual's behalf to obtain a government services or documents. In a study conducted by AlAwadhi and Morris (2009), Wasta has been identified as major contributing factors for the non-adoption of e-Government service in Kuwait (AlAwadhi and Morris, 2009). Majority of participants in that study (86%) expressed that they would use e-Government services if the importance of connections or "Wasta" was likely to be decreased in Kuwaiti society. The same participants claimed that Wasta acts contribute to maintain corruption in society and increases inequality between individuals.

Many of the interviewees claimed that Wasta is negatively affecting their performance. For example, some of the interviewees noted that sometimes they forced to process transactions with missing information because of Wasta. Some of the interviewees have a strong believe that Wasta can lead to process orders, even in spite of poor quality or incomplete information.

6.3.2 Level Variation in Information Technology

It is very common to see gaps and variation in the level of information technology readiness amongst e-Government organisations. The variation also can be seen in the level of expertise and human resources. This variation presents significant challenges to maximise the potential benefits of information quality. In addition, weakness of one of e-Governmental partner involved in providing information can eventually influence other e-Government partners. Lack of experience adds an extra burden and causes a range of problems including poor quality services and low performance, which represents a significant reputational risk to the institutional image.

Some of the interviewees revealed that they experienced major delays because they do not have in-house technical expertise to fix some of information quality problems. Other interviewees with managerial responsibilities noted that lack of experience and awareness of information security breaches can lead to damage the institutional image, citizen dissatisfaction and other major problems. They firmly assured that it is everyone responsibility to promote information security awareness in order to minimise information security problems.

6.3.3 Organisational Changes

Organisational changes are inevitable processes of any organisation. However, some of the employees find them easy to deal with. In fact, some employees show some resistance to these processes, which can have some negative consequences on organisations. These consequences can be widespread and may affect moral maturity and ethical attitude of the whole organisational workforce. In addition, when employees resist changes taking place in an organisation, they may feel insecure and pessimistic about their professional future with the organisation. This can lead them to become less focused on doing their daily jobs and spend more time on resisting these changes. Moreover, resistance to changes can create a disruptive work environment where clashes between employees and management team are highly expected.

The qualitative analysis revealed major concerns regarding resistance to changes among interviewees with management responsibilities. Some of these interviewees pointed out that to be able to achieve the maximum possible benefits of quality information all employees should have common view, by understanding targets and goals of the organisation and they should adhere to the policies and guidelines concerning information security. These findings are partially consistent with existing literature on challenges for e-Government initiatives (e.g. Burbridge, 2002; Ho, 2002; Edmiston, 2003; Gil-Garcia *et al.,* 2007). The main difference between this research and the mainstream literature is that this research focuses on the relationship between information quality and organisational benefits and performance in the context of e-Government, while the existing research studies investigate the relationship between e-Government initiatives in general and organisational benefits. However, this research is consistent with the mainstream literature in that resistance to changes have negative effects on organisational performance.

6.3.4 Challenges and Benefits Summary

To conclude, this section has discussed some issues which have emerged mainly through the qualitative analysis. These issues are classified under two groups: additional benefits of quality information, and challenges and barriers to the potential benefits of information quality. Research findings of both qualitative and quantitative analyses support the conceptual framework presented in Figure 3.6. In addition, these findings add some other elements of strategic benefits and institutional value of information systems which were found to be affected by information quality and affect institutional performance. Next section provides an updated version of the research framework including the new identified elements of strategic benefits and institutional value.

6.4 Revised Research Model

The conceptual research framework presented in Chapter 3 (Figure 3.6) considered four fundamental information quality attributes that were identified from the literature as key influencers on organisational performance. To investigate the relationships between information quality and organisational performance constructs, strategic benefits and institutional value of information quality were investigated as bridging dimensions between the two constructs. The analysis results of this research are congruent with the conceptual research framework. Moreover, the analysis results uncover some other element of strategic benefits and institutional value of information quality which were found to positively affect institutional performance. Figure 6.5 presents a revised research model including the new constructs which have been found affected by information quality and affect organisational performance.

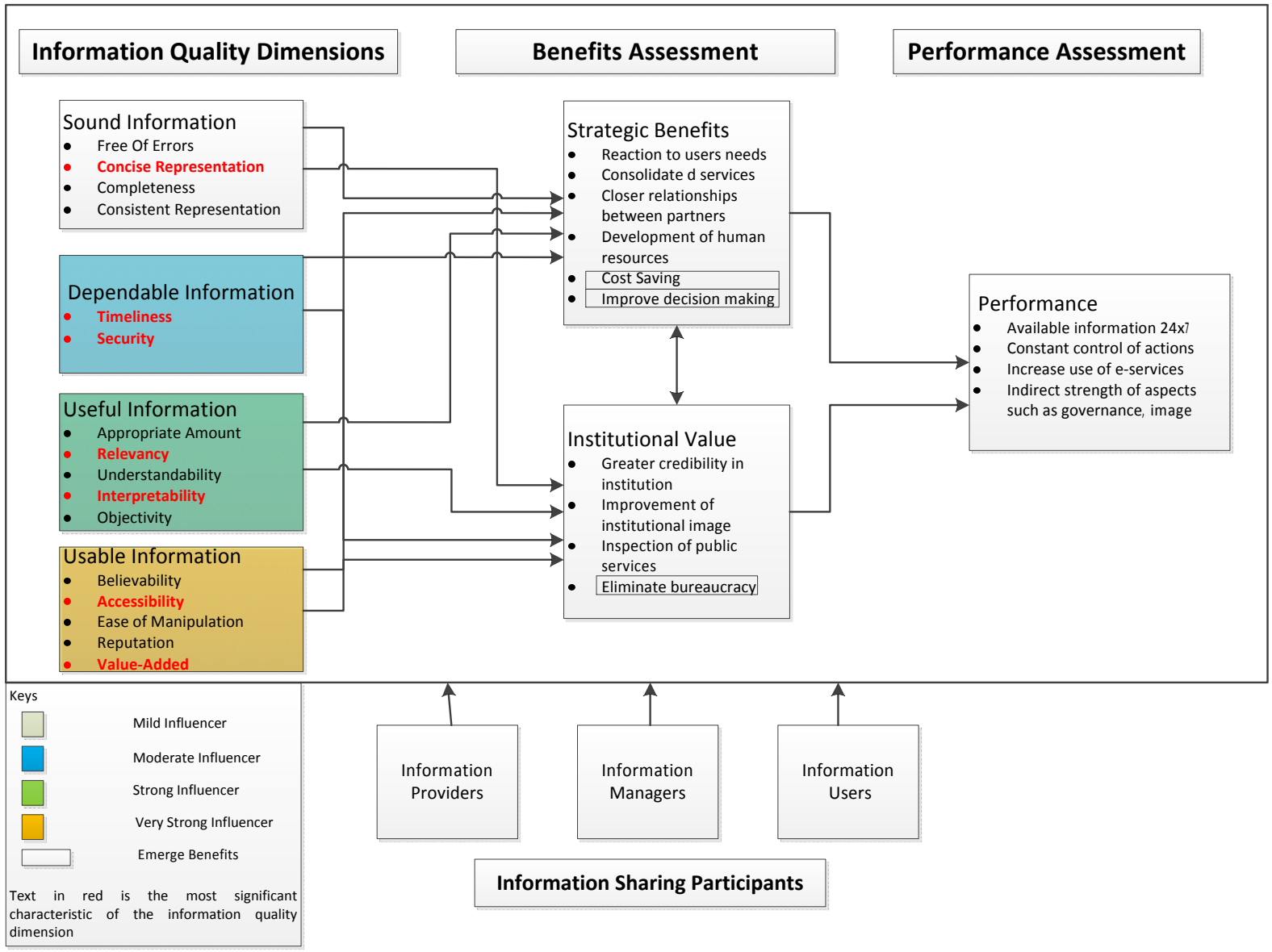


Figure 6.5: Enhanced Research Model

The research model presented in Figure 6.5 provided an empirical, actionable insight on the relationships between information quality and institutional value. To provide more detailed view of these relationships, Table 6.2 lists the key information quality benefits identified in this research and match each individual benefit with the related information quality dimensions.

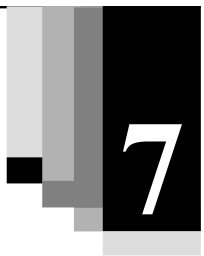
Benefit	Definition	E-Government Goals	Related IQ Dimension
Cost	Cost saving to the user from using the online channel	More efficient services	Free-of-Error Completeness
Time	Time saved by using the online channel	More efficient services	Timeliness Accessibility
Communication	Efficient method of communicating with local/central government	More efficient services	Consistent Representation Relevancy Understandability
Avoid Personal Interaction	To receive public services without having to interact with service staff	More effective services	Accessibility Timeliness Security
Control	The ability to exert personal control over the service	More effective services	Ease of Manipulation
Convenience	The ability to receive the service how and when the individual wants it	More effective services	Accessibility Timeliness
Personalisation	The ability to tailor the service to the individual	More effective services	Ease of Manipulation Concise Representation Consistent Representation
Ease of information retrieval	Useful and helps the user understand the service	More effective services	Relevancy Understandability Ease of Manipulation
Trust	Increase in trust and confidence in Government	Improved democracy	Objectivity Believability Reputation
Well-informed	Better informed, knowledgeable about government policy	Improved democracy	Timeliness Completeness Appropriate Amount
Participate in decision-making	Involved, exert influence in the democratic process	Improved democracy	Objectivity Believability Value added

Table 6.2: Information Quality Dimensions Linked with the Corresponding Benefits

The qualitative and quantitative analyses of the relationships between information quality, strategic benefits, and institutional values were in upright agreement. They both revealed positive and significant relationships between information quality attributes and strategic benefits. Similarly, both qualitative and quantitative analyses highlighted that improvement in different aspects of information quality can lead to a better organisational image. Both analyses also demonstrated significant positive relationship between strategic benefits, institutional image and organisational performance. Usability and usefulness attributes of

information quality came on the top of the key influencers on both strategic benefits and institutional value. The qualitative analysis revealed that usability and usefulness are interconnected attributes and users do not find discriminating differences between them. This finding can explain the similarities in the participants' views regarding the key attributes of information quality which affect strategic benefits and institutional image.

Both quantitative and qualitative analyses highlighted some differences among information sharing participants' views regarding the relationship between constructs investigated in this research. The qualitative analysis uncovered very interesting insights into these differences. For instance, the qualitative analysis revealed that information users were more concerned about the attributes of information quality that can help them to complete their daily tasks and jobs; while employees with managerial responsibilities were more concerned about the attributes that provided strategic advantages to e-Government services. The triangulation of quantitative and qualitative results showed a positive cross-validation among the two analysis methods. These results not only confirmed each other, but also provided in-depth explanation of the relationships between research constructs. However, some differences in results are expected in research applying methods triangulation. Nonetheless, this does not affect the validity and reliability of the major findings resulted from the two methods. These findings not only were in agreement with mainstream of the related literature, but also extend upon the literature and offer deeper insights and explanations on why and how information quality affect organisational performance.



Chapter 7: Conclusion, Contribution, Limitations and Further Research

7.1 Introduction

This chapter has 4 purposes: *(a)* to conclude the research carried out in this thesis, *(b)* to present its achievements and contributions, *(c)* to highlight the limitations in the research and *(d)* to propose areas for further research. Chapter 7 begins by summarising an overview of the research conducted in this thesis and drawing conclusions derived from the literature and empirical findings reported in Sections 7.1. The novelty (in terms of research contributions) claimed in this thesis is summarised in Section 7.2. Thereafter, the limitations of this research are identified and presented in Section 7.3. The author proposes that these limitations should be considered when interpreting results. Finally, the chapter concludes with discussions on limitations of this research, along with a discussion of some directions for future research in Section 7.4.

7.2 Research Summary

This research aimed at developing a model that best explains the information quality factors and their interrelationships that affect e-Government performance. The research presented in this thesis falls into three logical parts, corresponding to the three research phases: (1) *Research Problem Understanding*, (2) *Research Model Development* and (3) *Research Model Evaluation and Refinement*. The three research phases are outlined in the following three parts.

PART 1: The main objective of this part is to establish a theoretical foundation for the research. In addition to framing the key-concepts, this part builds foundations for a conceptual research model that theorises the relationship between information quality and e-Government performance. This part includes Chapters 1 and 2 and covers the phase of problem understanding. After establishing the importance of e-Government in transforming the quality of governmental services and increasing efficiency of administrative process, this part discusses the literature on information quality, bringing to light the beneficial outcomes that

can result from improved information quality. To provide a background for the field of study, this part also provides definitions of the key terms and identifies the scope of information quality covered in this research. Moreover, this part discusses e-Government success factors, focusing on information sharing and information quality in the success of e-Government projects and initiatives.

In addition, this part explores the literature on measuring and managing information quality, information quality and information sharing benefits and the role of information quality in e-Government adoption. With a focus on contemporary research, the literature review reported in this part aims to identify research gaps and to set research goals. The key research knowledge gaps identified in this part are:

- Despite the large amounts of research about information quality, few studies offer a comprehensive understanding of the relationship between information quality and organisations performance.

- The limited research on information quality and organisations performance focuses on private sectors and pays little attention to governments and public organisations. Where the private sector strategy focuses on competitiveness and government strategies focus on information sharing and integration between governmental organisations.

- To the best of the author's knowledge, there is no single study exists which adequately covers the relationships between information quality and organisations performance in Kuwait.

- E-Government success literature has rarely investigated information quality as a contributor to the success of e-Government initiatives.

- Much of the research has been descriptive in nature with relatively little theoretical grounding and do not provide explanations of the values, the significance and the relationships between variables

To overcome the above-mentioned gaps and drawing on existing literature and research findings, Part 2 proposes and discusses a conceptual model and contextual framework by means of which organisations performance and information quality research can be viewed. By doing so, this thesis contributes to the body of knowledge by examining the nature,

direction and strength of the connections between information quality and the success of e-Government initiatives.

PART 2: This part includes Chapters 3 and 4, which covered the research model development phase. The importance of this part is three-fold. *First*, it identifies the variables used for the research model. *Second*, it provides a road-map for empirical data collection and analysis. *Third*, it offers a frame of reference and potential lines of inquiry for empirical research on the impact of information quality on organisation performance.

- **Chapter 3** describes the conceptual IQBP model used in the thesis and the information quality factors hypothesised to affect organisation performance. The conceptual IQBP model developed in this thesis is based on a combination of the IQ/PSP model (*Khan et al.,* 2002) and the IS Success model (Delone *et al.,* 2003). The IQ/PSP model provides the information quality dimensions used to measure the quality of information being shared between governmental organisations. These dimensions include four information quality dimensions, namely, soundness, dependability, usefulness, and usability. The IS success model and Montagna's (2005) framework are used to quantify e-Government benefits and performance. Based on evidence from the literature, this chapter also provides a tentative answer to the research problem expressed in Part 1 in the form of hypotheses. These hypotheses depict the relationships between information quality ('cause') and organisational benefits and performance ('effect') variables.

- **Chapter 4** examines suitable methodological approaches and presents methodological issues considered in the research. Based on deliberations about underlying ontological and epistemological assumptions and related strengths and weakness of different research methods and approaches, this chapter justifies the use of hypothetic-deductive and inductive approach with mixed quantitative and qualitative methods to conduct the resent research. It also describes the choice of a research strategy leading to an action plan for getting from the questions (starting point) to a set of conclusions/answers (finishing point). Mixed method approach is used in this research. This thesis adopted a positivist philosophical approach that combined mixed method approach, quantitative and qualitative methodologies, to empirically validate the conceptual IQBP model developed in Chapter 3. To collect data, a survey questionnaire comprising five-point Likert scales is used followed by semi-structured interviews. The quantitative analysis starts from theory and moves towards empirical data. This analysis follows the deductive method in the search for relationships in the empirical data sets. The qualitative analysis combines the deductive and inductive approach to extract and

generate codes and themes. Adopting multiple methods in collecting and analysing the data sets gives the researcher confidence that the current research focuses only on the most important issues and enables validation, triangulation and refinement of selected methods.

PART 3: This part is the most important part of the thesis, which included Chapter 5 and 6 and covers the research model evaluation and refinement phase. This part illustrates how the quantitative and quantitative methods are employed to analyse both the pilot and the full-scale study. Multiple regression, correlations and analysis of variance (ANOVA) are the main statistical methods of data analysis used in this thesis. For the qualitative data analysis, the thematic analysis is used to develop a framework for organising and analysing the qualitative data. The quantitative analysis starts by presenting the results of a pilot study implemented prior to the full-scale study to test the validity and reliability of the research instrument and, then, the results of the full-scale study analysis is introduced and explained.

- **Chapter 5**, twelve (12) hypotheses formulated in Chapter 3 were tested using three dependent variables namely strategic benefits, institutional value and organisational performance against information quality dimensions as independent variables. All the hypotheses except *H9* and *H10* are evaluated using a stepwise multiple regression analysis to identify the independent variables that were considered as predictors of the dependent variables. A one-way ANOVA test is used to evaluate *H9* and *H10* and to find out if the different role of information sharing participants imposes a systematic difference in participants' responses. The quantitative analysis supports all the twelve hypotheses and revealed evidence that there are relationships between information quality, strategic benefits, institutional values and organisational performance. These relationships are systematically measurable and can be used to predict organisational benefits and performance.

  In addition, by utilising the qualitative method, Chapter 5 provides in-depth explanation and understanding of the relationships between research variables and verifies and confirms the statistical findings of the quantitative analysis. The qualitative analysis uses the thematic analysis to develop a framework for describing and organising the qualitative data and by generating codes and themes within the context of the study. The collected codes are grouped into sub-themes and themes according to the relationships between the variables, which have been identified in the quantitative analysis. Mostly, the qualitative analysis of the relationships between the research

variables confirms the results of the quantitative analysis. In general, the results of the qualitative analysis are in common agreement with the quantitative analysis. However, in some cases, the qualitative conclusions drawn are not consistent with the quantitative analysis. Nonetheless, this does not diminish the value of qualitative analysis; rather, it contributes to rise and highlights some issues not been considered in the quantitative analysis, in addition to elaborate those issues already discussed in the quantitative analysis.

- **Chapter 6** provides in-depth explanation and interpretation of both quantitative and qualitative research findings. The chapter also provides answers for the questions of why and how information quality affects strategic benefits and institutional value and ultimately institutional performance. Section 6.1 provided answers for the question what are the key information quality attributes, which have significant effects on strategic benefits and institutional value. The how-questions should be the easiest ones because they are based on why-questions and vice versa (Saariluoma, 2005). Therefore, improving the key information quality attribute, which identified in the present research will certainly maximise the strategic benefits and institutional values.

- In order to provide informative, empirical answers to research questions, this chapter presents a synthesis and interpretation of the relevant literature in relation to findings of this research. Moreover, this chapter applies a triangulation approach by relating the results of both qualitative and quantitative analyses to each other in order to gain a high validity of the evaluation results. This approach enabled the author to develop an enhanced version of the research model, which includes the new emerge factors that have been found to positively affect institutional performance.

  Findings from the analysis of *H1*, *H2*, *H3*, *H4* and the qualitative analysis support the existence of a positive relationship between sound, dependable, useful and usable information from one side and strategic benefits from the other side. These findings reveal that sound information is essential to provide timely and accurate information, which in turn leads to quick reaction to users' needs. These findings also reveal that dependable and secure information can reduce cost because lack of security increases customers' complaints, which, in turn, result in substantial increase of costs to deal with these complaints.

  In the same line, useful information offers enormous strategic benefits, including enhancing communications with partners and citizens and enabling better decision

making. Similar conclusion is drawn from the analysis of the relationships between usable information and strategic benefits, which reveal that usable information enhances communications with partners and citizens. The similarity between these findings and the views found in the literature both provide validation for these finding. Although all the information quality factors are found to be important, usability comes on the top of the key influencers on strategic benefits followed by usefulness, dependability and soundness, respectively.

Similarly, findings from the analysis of *H5*, *H6*, *H7*, *H8* and the qualitative analysis support the existence of a positive relationship between sound, dependable, useful and usable information from one side and institutional image from the other side. These findings reveal that sound information is vital to build up credibility of organisations and to strengthen their professional image. This is because incomplete information can delay or stop processing e-Government transactions, which in turn can cause miss-trust over the public. In addition to enhancing organisation credibility and image, dependable information is found to be a key enabler for community commitment and active participation in e-Government services. Usable and useful information makes it easy to track and monitor e-Government services, which reflects directly on institutional value. Usability comes on the top of the key influencers on institutional value followed by usefulness, dependability and soundness, respectively. Interestingly, this is the same ranking of importance for the information quality attributes, which is found in the relationships between information quality and strategic benefits. Usability and usefulness have been ranked as the key characteristics of high quality information which significantly affect strategic benefits and institutional value. This is because of the fact that the research participants are most concerned about system usability and usefulness because this enables them to answer questions and perform functions relevant to their job duties.

Both quantitative and qualitative analyses of *H9* and *H10* confirm the existence of some differences among information sharing participants' views regarding the relationship between information quality and strategic benefits. The qualitative analysis revealed some interesting and deeper insights on these differences. The qualitative analysis shows that users are more concerned about the attributes of information quality that can help them to complete their daily tasks and jobs, such as dealing with citizens' inquires and monitoring e-services; while employees with managerial responsibilities are more concerned about the attributes that provided strategic advantages to e-

Government services. For example, users' value accessibility and ease of manipulation over value added which is favoured by managers and provides.

The quantitative findings and the qualitative evaluation of *H11* indicate a strong and positive relationship between all the strategic benefits elements identified in Section 3.5 and organisational performance. The qualitative evaluation of *H11* assures the validity and reliability of the statistical findings. In addition, it discovers another three elements of strategic benefits which have not been identified in the quantitative analysis. These elements are 1) cost saving; 2) enhance decision-making process; and 3) improve citizen satisfaction. These results are in agreement with published findings, and the comparison with related literature confirms that high quality information can facilitate better-informed decision-making and enables cost-saving, and in turn, achieve high organisational performance. Based on these results, the most influential elements of strategic benefits on organisational performance is usable information. As expressed by many participants, usable information can improve organisational performance by enhancing productivity, increasing service adoption and improving overall customer satisfaction.

In the same line with *H11*, the quantitative analysis of *H12* supports the hypothesis of a significant relationship between institutional value elements and organisational performance. This analysis emphasizes the importance of improving various aspects of institutional value in order to increase organisation's performance. In addition, it reveals that improvement of institutional image, constant control of action, ability of inspection of public services and institutional credibility are the most influential element of institutional image, respectively. The qualitative evaluation of *H12* clearly asserts the positive correlation between institutional value and organisation performance. In addition, it explains why those relationships exist. As noted by many participants, improvement in institutional image and credibility can greatly increase organisational performance. This is because the organisations will reduce the need to devote their resources to establish their image and credibility and will free these resources for more productive purposes. Chapter 6 concludes the qualitative and quantitative analyses by providing an enhanced research model (Figure 6.5) including the new constructs which have been found affected by information quality and affect organisational performance. Having summarised the research results and findings, the next section highlights the major contributions and implications of this research.

7.3 Research Contributions and Implications

The contributions achieved throughout this thesis are diverse covering methodological, theoretical and applied implications. This thesis adds value to research and practice of e-Government. In addition, it provides a theoretical research model for extending previous work on explaining the relationships between information quality and organisations performance. This model is particularly useful for researchers because it helps to organise and incorporate the divers aspects of the research problem identified in this thesis in a simple and consistent way. This model is also valuable for practice because it helps government agencies to become more proactive in overcoming barriers that hinder performance. For example, this model can help e-Government agencies to be proactive about information security, and not wait for an incident to occur before something is done.

7.3.1 Theoretical Contributions

The research model developed in this research, illustrates the structural relationships among influencing factors of information quality on organisation performance. This model elucidates why and how information quality affects strategic benefits and institutional value and ultimately institutional performance. This model synthesizes two proven research instrument and model for information quality called IQ/PSP (Kahn *et al.,* 2002), and an instrument called IS Success Model (Delone and McLean, 2010) to measure organisational performance. In this manner, this model is better suited to analysing and understanding the relationships, interdependencies, and impacts of information quality on organisation performance. In addition, this research developed a theoretical research model that can guide future research studies. In comprising with the existence research, this model has the following advantages:

- Provide a platform to explain the value, the significance and the causality of relationships between variables.

- Offer tools for planning proactive responses to potential threats to information quality, such as planning for information security policy and developing security program.

- Include intermediate factors of strategic benefits and institution value which affect organisation performance and are affected by information quality.

- Uncover some new drivers (Cost saving and customer satisfaction) and barriers (e.g. Nepotism and Wasta) to improving organisational performance.

7.3.2 Practical Contributions

The research model proposed in Figure 6.5 offers a generic, usable, comprehensive model of key information quality factors that influence the performance of e-Governments projects. The model constructed from four information quality variables, namely, soundness, dependability, usefulness, and usability, and three benefit variables, namely, strategic benefits, institutional value, and organisational performance. This model can be utilised by e-Government managers as a strategic decision support tool to improve organisation performance, by means of quality, productivity and cost saving. It can help in outlining a roadmap for e-Government agencies to be aware of the key information quality factors that stimulate or impede organisation performance. In addition, this model can help in facilitating the development and planning of e-Government projects by defining information quality requirements.

7.4 Research Limitations

As with any study, this research encountered some difficulties and limitations. These limitations can be summarised into five broad categories:

- ***First***, there are some limitations in the data collected for this research. These data is collected from three governmental agencies in Kuwait. Those agencies have a relatively similar profile in terms of the portfolio of the e-Government services they offer. Therefore, the sample of the data collected is not representative of the entire Kuwaiti population and thus may introduce some bias to the results of this study. In addition, and as this study confined to Kuwait, the findings of this research cannot be generalised to other countries because each country has unique characteristics, needs and capabilities. However, the main contribution of this research, the research model in Figure 6.5, provides a valuable and reliable tool to explore information quality drivers and barriers to improving organisation performance within the Kuwaiti context.
- ***Second***, the collecting data process presents some challenges. Only few participants were motivated to participate in the research interviews. Participants of this study were government employees who are usually overworked and busy with their daily tasks. Also, access to the participants with top management responsibilities was not an easy task. In addition, another challenge was related to culture issues. For example, some female participants were uncomfortable to be with a male in the same room beyond close doors. To overcome these challenges, the author put extra time

and effort to make arrangement to conduct interviews with as many participants as possible. The author also acquired some help from a female assistant who is familiar with academic research settings to conduct some interviews with female participants.

- ***Third***, the analysis process presents also some challenges. The collected data from the interview was in Arabic language and translation of this data into English language was a challenging task and prone to errors. To overcome this challenge, the author followed Brislin' back-translation method (Brislin, 1980) by translate data back and forth between Arabic and English and with help of several bilingual experts. This process continues until the Arabic and English items were converged. Another challenge related to the analysis process is the large amount of codes emerged from the qualitative analysis. This forced the author to revisit the codes and refine the codes as much as possible, which results, in turn, into more high-level themes and categories.

- ***Fourth*****,** to measure and analyse the performance of any system, objective and quantifiable means to measure performance are needed. Developing these means is a challenging and intricate task. Although this study adopted a well-founded IS Success model (Delone *et al.,* 2003) to quantify performance, this study clearly experiences a limitation related to the subjectivity in the process of quantifying and measuring organisation performance.

- ***Fifth***, although this study provides a valuable and reliable research model to explore information quality drivers and barriers to improving organisation performance, this model, nor the recommendations and findings of in this study can constitute a guarantee for improving government performance. E-Government projects are complex, encompassing, cultural, political, organisational and technical aspects. Information quality aspects are not the only factors that affect the success of e-Government projects. Therefore, policymakers and stakeholders should consider all relevant factors that may contribute to the improvement of the performance of e-Government organisations.

7.5 Future Research Directions

Generalisation is one of the main issues in e-Government research. In order to increase generalisation of the study, future research can build on the conclusions of this research to validate the research model developed in in Figure 6.5 in different context and countries. Also to realise a good generalisation it is recommended to extend the developed model with factors

related to cultural, political and organisational aspects of e-Government. In terms of the methodology, two important areas for future research are suggested:

- Future research should employ new tools to collect data such as focus group and web logs. Focus group can provide insights into participant's shared understandings, while web logs can provide a great deal of insight into user interactions with e-Government services.

- Using these new methods to collect data required employing new data analysis tools and techniques such as data mining, text analytics and sentimental analytics. Other possible areas for future research are developing and applying new methods and Key Performance Indicators (KPI) to measure organisation performance.

- Web logs can offer a treasure trove of data including, but not limited to, location data, traffic data, conversion data, and behavioural data. The analysis of these data can provide more accurate and actionable metrics and KPIs. Future research also might incorporate citizens' perspectives and views in regard to the relationships between information quality and organisation performance.

7.6 Personal Remark

Having completed my PhD thesis was one of the most exciting and rewarding learning experiences I have ever had. My PhD journey allows me to expand my knowledge in areas that are of particular interest to me. This journey enables me to gain a comprehensive view of information quality aspects, which affects organisation performance. In addition, it gives me the opportunity to build on my professional experience in the field of organisation development and develop my independent research skills to become an established research scientist. Moreover, it made me more inquisitive person about many different things in life and the world.

Furthermore, there are few steps, the author would consider doing differently in future research, steps such as making sure that there is a good access to people and data prior to the empirical stage. Also, extra effort will be put in to develop the research design, and methods to be used, and utilise graphical research maps when communicating and discussing research with others.

Although I have considerable management experience and skills, I found doing my PhD incredibly enlightening, and life changing experience. Through my PhD I learned how to manage my time, energy, and motivation much more effectively. My PhD journey also has brought me in contact with many excellent people that provided me with perspectives and information I could never have gotten anywhere. Finishing my PhD is one achievement I feel really proud of and I am looking forward enormously to back again to my professional career aiming to apply what I have learned in the real world.

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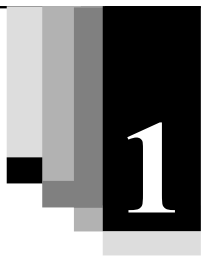

Appendix 1: Questionnaire in English

PART 1 - Classification Questions

Please answer the following questions with one tick (✓) only for each question:

1. Please indicate your gender
   - ☐ Male
   - ☐ Female

2. What is your age?
   - ☐ 20 or under
   - ☐ 21- 30
   - ☐ 31- 40
   - ☐ 41 -50
   - ☐ 51- 60
   - ☐ 61 +

3. What is your highest level of education
   - ☐ High school & below
   - ☐ Diploma
   - ☐ Bachelor
   - ☐ Higher education

4. Occupation
   - ☐ Employee
   - ☐ Section Head
   - ☐ Manager
   - ☐ Director or above

5. What is your use of governmental information systems
   - ☐ Don't use

- ☐ Less than one year
- ☐ From 1-3 years
- ☐ From 3-5 years
- ☐ More than 5 years

PART 2 – Defining the Participant Role in the Information System Project

The following items address the nature of your interaction with the information system in use. My interactions with the information system in use are in the following ways (check all that apply):

1. Participant : Information Provider
   - ☐ Provide information for others
   - ☐ Update or modify data

2. Participant : Information User
   - ☐ Look up information
   - ☐ Receive reports
   - ☐ Obtain services
   - ☐ Monitor status of services

3. Participant : Information Manager
   - ☐ Design or deploy information systems
   - ☐ Manage, operate, or administer information systems

PART 3 – Strategic Benefits, Institutional Value & Performance from Information Use

Each item below addresses your understanding of the benefits your organisation derives from the use of the shared information in this system.

For each item, select a number from 1 to 5 that best completes the sentence: "Use of the information in this system . . .".

The number 1 indicates that you strongly disagree with the statement, and 5 indicate that you strongly agree.

"Use of the information in this system . . ."

1. Enables quick reaction to my needs.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

2. Allows consolidated services.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

3. Allows creation of new and innovative e-Services.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

4. Helps to create closer relationships among partners.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

5. Provides new communication and operation channels.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

6. Generates new links and networks: alliances and communities.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

7. Improves knowledge of user's needs.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

8. Enables development of human resources.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

9. Provides indirect strength of aspects such as governance, image.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

10. Increases use of e-Services.

O	**O**	**O**	**O**	**O**

1 2 3 4 5

11. Enables greater credibility in institutions.

O **O** **O** **O** **O**
1 2 3 4 5

12. Improves institutional image.

O **O** **O** **O** **O**
1 2 3 4 5

13. Allows government tracking from any place.

O **O** **O** **O** **O**
1 2 3 4 5

14. Provide constant control of actions.

O **O** **O** **O** **O**
1 2 3 4 5

15. Enhances inspection of public services.

O **O** **O** **O** **O**
1 2 3 4 5

16. Allows more active participation in all government actions.

O **O** **O** **O** **O**
1 2 3 4 5

PART 4 – Information Quality Assessment

Each item below addresses the quality of information in the information system used. Select the number from 1 to 5 to indicate the extent to which you agree with the statement, where 1 indicates not at all, 3 indicates average, and 5 indicates completely.

1. This information is sufficiently complete for our needs.

O **O** **O** **O** **O**
1 2 3 4 5

2. This information covers the needs of our tasks.

O	O	O	O	O
1	2	3	4	5

3. This information is presented concisely.

O	O	O	O	O
1	2	3	4	5

4. The representation of this information is compact and concise.

O	O	O	O	O
1	2	3	4	5

5. This information is consistently presented in the same format.

O	O	O	O	O
1	2	3	4	5

6. This information is accurate.

O	O	O	O	O
1	2	3	4	5

7. This information is reliable.

O	O	O	O	O
1	2	3	4	5

8. This information is of sufficient volume for our needs.

O	O	O	O	O
1	2	3	4	5

9. The amount of information is neither too much nor too little.

O	O	O	O	O
1	2	3	4	5

10. It is easy to interpret what this information means.

O	O	O	O	O
1	2	3	4	5

11. The measurement units for this information are clear.

O	O	O	O	O

1 2 3 4 5

12. This information is appropriate for our work.

O **O** **O** **O** **O**
1 2 3 4 5

13. This information is applicable to our work.

O **O** **O** **O** **O**
1 2 3 4 5

14. This information is easy to understand.

O **O** **O** **O** **O**
1 2 3 4 5

15. The meaning of this information is difficult to understand.

O **O** **O** **O** **O**
1 2 3 4 5

16. This information is based on facts.

O **O** **O** **O** **O**
1 2 3 4 5

17. This information presents an impartial view.

O **O** **O** **O** **O**
1 2 3 4 5

18. This information is protected against unauthorised access.

O **O** **O** **O** **O**
1 2 3 4 5

19. This information is not protected with adequate security.

O **O** **O** **O** **O**
1 2 3 4 5

20. This information can only be accessed by people who should see it.

O **O** **O** **O** **O**
1 2 3 4 5

21. This information is sufficiently current for our work.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

22. This information is not sufficiently timely.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

23. This information is sufficiently up-to-date for our work.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

24. This information is believable.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

25. This information is trustworthy.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

26. This information is easy to manipulate to meet our needs.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

27. This information is easy to combine with other information.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

28. This information has a poor reputation for quality.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

29. This information comes from good sources.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

30. This information is easily accessible.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

31. This information is quickly accessible when needed.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

32. This information provides a major benefit to our work.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

33. This information adds value to our tasks.

O	**O**	**O**	**O**	**O**
1	2	3	4	5

2

Appendix 2: Questionnaire in Arabic

استبيان علمي

بحث عن جودة المعلومات
والفوائد الأستراتجية
لنظم المعلومات

عزيزي مستخدم نظم المعلومات ،،،،

أنا باحثأجري دراسة مسحية عشوائية بالتنسيق مع جامعة برونيل في لندن، المملكة المتحدة لكشف دور جودة المعلومات بالحصول على الفوائد الأستراتيجية من الحكومة الألكترونية (نظم المعلومات) في دولة الكويت.وإننا ننشد مساعدتك لتحقيق هدفنا من خلال قيامك بملء الاستبيان المرفق.

إن الهدف الرئيسي من هذا الإستبيان هومحاولة تحسين جودة المعلومات والحصول على الفوائد الأستراتجيه من نظم المعلومات المستخدمه في حكومة دولة الكويت

إن الاستبيان المصمم لهذه الدراسة ينقسم إلى أربعة أقسام : القسم الأول يجمع بيانات عامة عن تصنيف الأشخاص المستطلعة آراؤهم بينما يحدد القسم الثاني نوعية التفاعلات مع نظم المعلومات اما القسم الثالث يقيم الفوائد الأستراتيجية المحصلة من نظم المعلومات بيمنا يغطي القسم الرابع تقيمك لجودة المعلومات المستخدمه في نظم المعلومات

ولكي نقوم بتشكيل بنك من الأدلة التي تمثل العينة المستطلعة فمن الضروري ملء الاستبيان بكاملة. وسيتم التعامل مع جميع المعلومات المقدمة بسرية مطلقه ولن تكون متاحة إلا للباحثين الأكاديميين المعنيين بهذه الدراسة. ولن يتم كشف أي معلومات تتعلق بأي فرد إطلاقا لأي طرف مهما تكن الظروف. ولن يستغرق الاستبيان إلا 10إلى 15دقيقة من وقتكم لإنهائه. ومشاركتكم محل تقديرنا الشديد حيث ستسهم في نجاح هذه الدراسة. فإذا كان لديكم أي تساؤلات أو قلق يرجى الاتصال بي على رقم هاتفي أو عنواني الألكتروني

نشكركم على تعاونكم في إتمام هذه الدراسة الهامة ،،،

حسين سعود العنزي

بحث لرسالة دكتوراه

جامعة برونيل

لندن / المملكة المتحدة

(965) 99400411

HUSSAIN.ALENEZI@BRUNEL.AC.UK

الجزء الأول

اسئلة تصنيفيه : يرجي الاجابه على الأسئله التاليه بوضع إشارة بجانب كل سؤال

1. يرجى تحديدالجنس؟

- ❒ ذكر
- ❒ أنثى

2. ما هو العمر؟

- ❒ 20 أو أقل
- ❒ 21- 30
- ❒ 31- 40
- ❒ 41 -50
- ❒ 51- 60
- ❒ 61 +

3. أعلىمستويتعليمي؟

- ❒ شهادة ثانوية أو أقل
- ❒ دبلوم
- ❒ بكالوريوس
- ❒ تعليم عالي

4. الوظيفة؟

- ❒ موظف
- ❒ رئيس قسم
- ❒ مراقب
- ❒ مدير إداره أو أعلى

5. استخدامك لنظم المعلومات الحكوميه ؟

- ❒ لا أستخدم
- ❒ أقلمنسنة
- ❒ من 1 – 3 سنة
- ❒ من 3– 5 سنة
- ❒ أكثر من خمسةسنوات
- ❒ أسم الإدارة (إذا رغبت)……

الجزء الثاني

تحديد دور المشارك في مشروع نظام المعلومات :

النقاط التالية تناقش طبيعة التفاعل مع نظام المعلومات المستخدم .

التفاعلات الخاصة بي مع نظام المعلومات المستخدم من خلال الطرق الأتية (أشر على كل ما يتم تطبيقة)

1. نوع التفاعل : مزود المعلومات

- ❒ تزويد الآخرين بالمعلومات
- ❒ تحديث أو تعديل بيانات

2. نوع التفاعل : مستخدم المعلومات

- ❒ البحث عن المعلومات

- ❒ استلام تقارير
- ❒ الحصول على خدمات
- ❒ عرض للخدمات

3. نوع التفاعل : إدارة نظم المعلومات

- ❒ التصميم ونشر المعلومات
- ❒ معالجة وتشغيل وإدارة نظم المعلومات

الجزء الثالث

الفوائد الإستراتيجية من استخدام المعلومات : -

النقاط التاليه تناقش مدي استعابك للفوائد التي استمدتها الأدارة من استخدام المعلومات في هذا النظام .

لكل نقطة ، قم بالاختيار الأنسب من رقم 1 إلي 5

الرقم 1 يدل على انك غير موافق على الجملة ورقم 5 يوضح انك توافق بشدة .

اكمل هذه الجملة " استخدام المعلومات في هذا النظام "

1. يساعد على التفاعل السريع لإحتياجات المستخدمين .

O	**O**	**O**	**O**	**O**
5	4	3	2	1

2. يسمح بتقديم الخدمات المتكاملة .

O O O O O
5 4 3 2 1

3. يسمح بخلق خدمات الكترونية جديدة ومبتكرة .

O O O O O
5 4 3 2 1

4. ساعد في خلق علاقات أكثر ترابطا بين الإدارات .

O O O O O
5 4 3 2 1

5. يوفر وسيلة اتصالات جديدة وقنوات اتصال إضافيه.

O O O O O
5 4 3 2 1

6. ينتج روابط وشبكات جديدة وتعاون مع جهات مخلفه .

O O O O O
5 4 3 2 1

7. يحسن معرفتنا باحتياجات المستخدمين .

O O O O O
5 4 3 2 1

8. يساعد على تنمية الموارد البشرية .

O O O O O
5 4 3 2 1

9. يوفر مصارد قوة غير مباشرة مثل الحوكمه والسمعة الجيدة .

O O O O O
5 4 3 2 1

10. يزيد من استخدام الخدمات الالكترونية .

O O O O O
5 4 3 2 1

11. يساعد بوجود مصداقية أكثر في المؤسسات والوزارات .

O	O	O	O	O
5	4	3	2	1

12. يحسن من الصورة العامة للمؤسسات و الوزارات.

O	O	O	O	O
5	4	3	2	1

13. يسمح لمتابعة خدمات الحكومة من أي مكان وفي أي وقت .

O	O	O	O	O
5	4	3	2	1

14. يوفر التحكم المستمر في جميع أنظمة المعلومات .

O	O	O	O	O
5	4	3	2	1

15.يساعد على عملية المراقبه للخدمات العامه .

O	O	O	O	O
5	4	3	2	1

16. يسمح بمشاركة أكثر فاعلية في كل نشاطات الحكومة .

O	O	O	O	O
5	4	3	2	1

الجزء الرابع
تقييم جودة المعلومات

قم بالاختيار من الرقم 1إلي الرقم 5 لتوضيح مدى توافقك مع الجملة ، حيث يشير الرقم 1 إلي عدم الموافقة على الإطلاق ويشير الرقم 3 إلي الوسط ويشير رقم 5 إلي الموافقة التامة .

النقاط التاليه تناقش جودة المعلومات الموجوده في نظام المعلومات :-

1. هذه المعلومات كامله .

O	O	O	O	O
5	4	3	2	1

2. هذه المعلومات تسد احتياجات مهامنا .

O	O	O	O	O
5	4	3	2	1

3. هذه المعلومات مقدمة بإيجاز .

O	O	O	O	O
5	4	3	2	1

4. هذا العرض للمعلومات موجز ومنظم .

O	O	O	O	O
5	4	3	2	1

5. هذه المعلومات تقدم بنفس الشكل والأسلوب .

O	O	O	O	O
5	4	3	2	1

6. هذه المعلومات دقيقة .

O	O	O	O	O
5	4	3	2	1

7. هذه المعلومات يعتمد عليها .

O	O	O	O	O
5	4	3	2	1

8. هذه المعلومات ذات مقدار واف لما نحتاجه .

O	O	O	O	O
5	4	3	2	1

9. حجم المعلومات ليس بالكثير جدا ولا بالقليل جدا .

O	O	O	O	O
5	4	3	2	1

10. من السهولة أن تفسر ما المقصود من هذه المعلومات .

O	O	O	O	O
5	4	3	2	1

11. وحدات القياس لهذه المعلومات واضحة .

O O O O O
5 4 3 2 1

12. هذه المعلومات ذات صله وثيقة بعملنا .

O O O O O
5 4 3 2 1

13. هذه المعلومات يمكن تطبيقها بما يناسب عملنا .

O O O O O
5 4 3 2 1

14. هذه المعلومات من السهل استيعابها .

O O O O O
5 4 3 2 1

15. من الصعب استيعاب مغزى هذه المعلومات .

O O O O O
5 4 3 2 1

16. هذه المعلومات معتمده على حقائق .

O O O O O
5 4 3 2 1

17. هذه المعلومات مقدمه بشكل حيادي .

O O O O O
5 4 3 2 1

18. هذه المعلومات محمية بحيث لا يمكن لغير المصرح لهم الوصول إليها .

O O O O O
5 4 3 2 1

19. هذه المعلومات غير محمية بنظام حمايه مناسب .

O	O	O	O	O
5	4	3	2	1

20. هذه المعلومات يمكن الإطلاع عليها فقط من خلال الأشخاص المسموح لهم برؤيتها .

O	O	O	O	O
5	4	3	2	1

21. هذه المعلومات حديثة بشكل مناسب لعملنا في الوقت الحالى .

O	O	O	O	O
5	4	3	2	1

22. هذه المعلومات لا تأتي في الوقت المناسب .

O	O	O	O	O
5	4	3	2	1

23. هذه المعلومات حديثة ومناسبة لعملنا .

O	O	O	O	O
5	4	3	2	1

24. هذه المعلومات يمكن تصديقها

O	O	O	O	O
5	4	3	2	1

25. هذه المعلومات موثوق بها .

O	O	O	O	O
5	4	3	2	1

26. هذه المعلومات يمكن استخدامها بسهولة بما يلبي احتياجاتنا .

O	O	O	O	O
5	4	3	2	1

27. هذه المعلومات من السهل أن تدمج مع معلومات أخرى .

O	O	O	O	O

5 4 3 2 1

28. هذه المعلومات لها سمعة سيئة عن جودتها .

O O O O O
5 4 3 2 1

29. هذه المعلومات تم الحصول عليها من مصادر جيدة

O O O O O
5 4 3 2 1

30. هذه المعلومات يمكن الحصول عليها بسهولة .

O O O O O
5 4 3 2 1

31. هذه المعلومات يمكن الوصول إليها سريعا عند الضرورة .

O O O O O
5 4 3 2 1

32. هذه المعلومات تقدم فائده أساسيه لعملنا .

O O O O O
5 4 3 2 1

33. هذه المعلومات تضيف قيمه لمهامنا .

O O O O O
5 4 3 2 1

Appendix 3: Interview Questions in English

Q1: What is the role of sound information to get strategic benefits?

Q2: What is the role of useful information to get strategic benefits?

Q3: What is the role of dependable information to get strategic benefits?

Q4: What is the role of usable information to get strategic benefits?

Q5: What is the role of sound information to get institutional value?

Q6: What is the role of useful information to get institutional value?

Q7: What is the role of dependent information on which the institutional value is depending?

Q8: What is the role of usable information in institutional value?

Q9: Through a questionnaire applied for governmental employees, it revealed that briefing, arrangement, form and manner are the most important standards of sound information that leads to get strategic benefits and institutional value. Why?

Q10: Through a questionnaire applied for governmental employees, it revealed that simple interpretation and adequate quantity of information and close correlation of duties are the most important standards of useful information that leads to get strategic benefits and institutional value. Why?

Q11: Through a questionnaire applied for governmental employees, it revealed that new information that acquired in proper time is one of the most important standards of dependable information that leads to get strategic benefits and institutional value. Why?

Q12: Through a questionnaire applied for governmental employees, it revealed added value information is the most important standard of useful information that leads to get strategic benefits and institutional value. Why?

Q13: What is the role of strategic performance in governmental performance improvement?

Q14: What is the role of institutional value in governmental performance improvement?

Q15: Do you have any other comments or information?