<div dir="rtl">

إقـــرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

</div>

Towards An Abbreviated Model of IT governance for Palestinian government sector According to COBIT 5 framework

<div dir="rtl">

أقر أن ما اشتملت عليه هذه الرسالة إنما هو نتاج جهدي الخاص، باستثناء ما تمت الاشارة إليه حيثما ورد، و إن هذه الرسالة ككل أو أي جزء منها لم يقدم من قبل لنيل درجة أو لقب علمي أو بحثي لدى أي مؤسسة تعليمية أو بحثية أخرى.

</div>

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and not has been submitted elsewhere for any other degree or qualification.

Student's name: *Rami R. Lubbad*

Signature:

Date:6/9/2014

<div dir="rtl">

اسم الطالب: رامي رياض محمد لبد

التوقيع:

التاريخ:6/9/2014

</div>

The Islamic University of Gaza

Higher Education Deanship

Faculty of Commerce

Business Administration Department

Towards An Abbreviated Model of IT governance for Palestinian government sector According to COBIT 5 framework

Submitting By

Rami R. Lubbad

Supervised By

Prof. Dr. Yousif Ashour

Thesis

Submitted in Partial Fulfillment of Requirement for MBA

May, 2014

بسم الله الرحمن الرحيم

الجامعة الإسلامية – غزة
The Islamic University - Gaza

مكتب نائب الرئيس للبحث العلمي والدراسات العليا

هاتف داخلي 1150

الرقم: غ/35/.............. Ref

التاريخ: 2014/05/24 Date.............

نتيجة الحكم على أطروحة ماجستير

بناءً على موافقة شئون البحث العلمي والدراسات العليا بالجامعة الإسلامية بغزة على تشكيل لجنة الحكم على أطروحة الباحث/ رامي رياض محمد لبد لنيل درجة الماجستير في كلية *التجارة*/ قسم إدارة الأعمال وموضوعها:

Towards an Abbreviated Model of IT Governance for Palestinian Government According to COBIT 5 framework

وبعد المناقشة التي تمت اليوم السبت 25 رجب 1435 هـ، الموافق 2014/05/24 الساعة الثانية مساءً، اجتمعت لجنة الحكم على الأطروحة والمكونة من:

أ.د. يوسف حسن عاشور	مشرفاً ورئيساً	
أ.د. فارس محمود أبو معمر	مناقشاً داخلياً	
د. أيمن أحمد أبو سمرة	مناقشاً خارجياً	

وبعد المداولة أوصت اللجنة بمنح الباحث درجة الماجستير في كلية *التجارة*/ قسم *إدارة الأعمال*.

واللجنة إذ تمنحه هذه الدرجة فإنها توصيه بتقوى الله ولزوم طاعته وأن يسخر علمه في خدمة دينه ووطنه.

والله ولي التوفيق ،،،

مساعد نائب الرئيس للبحث العلمي و للدراسات العليا

أ.د. فؤاد علي العاجز

Abstract

Towards An Abbreviated Model of IT governance for Palestinian government sector According to COBIT 5 framework

This study aimed to identify the most priority high-level processes of IT governance for Palestine government sectors and suggest an abbreviated model of IT governance according to COBIT version 5 framework as the basis to integrate IT governance framework in the Palestinian government sectors.

This research used a survey methodology to collect the information, and designed 10 rating scale to obtain priority ratings from Palestinian government sector for each of the high level IT processes.

Comprehensive survey technique was used, and distributed to 57 responders of IT-related managers in Palestinian government of Gaza. Fifty-one surveys were compiled to form a ranked list of the most priority IT governance processes for the Palestinian government sectors.

The findings of the study revealed thirteen IT governance processes that considered top prioritized by the respondents and laid between ranks 7.55 and 6.65 of 10. Since twelve of the list were also identified by the other studies, this emphasizes that these processes are to be independent of context (international or national) and organizational settings. One IT process is a unique to Palestinian government sectors were also identified. Furthermore, the study identified three processes were not listed in high ranked list of this study but were considered as a prioritized processes for IT governance in previous studies. The study recommends to taking into account these processes when implementing IT governance for Palestinian government sector.

The study suggests a proposed an abbreviated model of IT governance contains 16 high-level processes derived from COBIT 5 that may applicable for Palestinian government sector. The proposed model contains the list of 13 high-level processes that revealed in this study and the other 3 processes were identified by other authors.

The study recommended the Palestinian government to give more concern to standardize their IT governance processes and to adopt implementing an IT governance framework according to the proposed model in this study. The study also encouraged other researchers to take procedures in applying such research on other samples or sectors, especially on government sectors.

ملخص الرسالة

"نحو نموذج مصغر لحوكمة تكنولوجيا المعلومات للحكومة الفلسطينية
وفقا لاطار COBIT5"

هدفت هذه الدراسة إلى التعرف على عناصر حوكمة تكنولوجيا المعلومات الأكثر أولوية لقطاعات الحكومة الفلسطينية و اقتراح نموذج مصغر لحوكمة تكنولوجيا المعلومات، و ذلك وفقا لاطار الحوكمة COBIT 5، كخطوة أولى لتطبيق حوكمة تكنولوجيا المعلومات في قطاعات الحكومة الفلسطينية.

استخدمت الدراسة الاستبيان كأداة لجمع البيانات، و صممت اجاباته لتكون ما بين 1 الى 10 لتبيان الأولوية لكل عنصر من عناصر حوكمة تكنولوجيا المعلومات وفقا لقطاعات الحكومة الفلسطينية

و قد تم استخدام أسلوب المسح الشامل، و تم توزيع الاستبانة على مدراء تكنولوجيا المعومات في الحكومة الفلسطينية في غزة و عددهم 57. و تم جمع 51 استبانة من أجل تكوين قائمة من عناصر حوكمة تكنولوجيا المعلومات الأكثر أولوية لدى الحكومة الفلسطينية.

و لقد أظهر نتائج الدراسة قائمة من 13 عنصر تتراوح نتائجهم بين 7.55 و 6.65 من 10. كما أظهرت أن 12 عنصرا منها ظهرت في دراسات سابقة، و هذا يبين أن هذه العناصر مستقلة و لا تعتمد على السياق المكاني (دولي أو محلي) كما أنها لا تعتمد على الاطار التنظيمي للمنظمات. كما تم تحديد عنصر واحد من القائمة تنفرد بهما الحكومة الفلسطينية. علاوة على ذلك، حددت الدراسة 3 عناصر لم تظهر في الدراسة ضمن قائمة العناصر الأكثر أولوية و لكن تم اعتبارها من عناصر تكنولوجيا المعلومات الأكثر أولوية في الدراسات السابقة. و أوصت الدراسة إلى مراعاة هذه العناصر عند تطبيق حوكمة تكنولوجيا المعلومات لدى الحكومة الفلسطينية.

و تقترح الدراسة نموذج مصغر لحوكمة تكنولوجيا المعلومات يحتوي على 16 عملية مشتقة من اطار COBIT 5، و يمكن تطبيقها على قطاعات الحكومة الفلسطينية. النموذج المقترح يحتوي على العمليات الثلاثة عشر الناتجة عن هذه الدراسة. اضافة الى الثلاث عمليات الأخرى التي ظهرت في الدراسات الأخرى.

و أوصت الدراسة الحكومة الفلسطينية لإعطاء مزيد من الاهتمام في وضع معايير لحوكمة تكنولوجيا المعلومات و اعتماد تطبيق نموذج لحوكمة تكنولوجيا المعلومات وفقا للنموذج المقترح في هذه الدراسة. كما شجعت الدراسة الباحثون إلى اتخاذ إجراءات في تطبيق مثل هذه البحوث على عينات و قطاعات أخرى، وخاصة القطاعات الحكومية.

Dedication

To those whose kindness, patience and support were the candles that enlightened my way towards success; my Father and Mother.

To my beloved wife who saved no efforts in encouraging and supporting me during my journey toward success.

To my children "Razan, Majd and Riad" who have been my constant source of inspiration.

Without their love and support this research would not have been made possible.

Acknowledgements

I would like to express my special appreciation and thanks to my advisor Professor Dr. Yousif Ashour, who has been a tremendous mentor for me. I would like to thank him for his endless intellectual support and encouragement throughout the period of his supervision on this research and for allowing me to grow as a researcher.

I would also like to thank the examiners' of the study Professor Dr. Faris Abu Mouamer and Dr. Aiman Abu Samra for their brilliant comments and suggestions.

I would especially to thank the Islamic University and its staff for all the facilities for help and advice they offered.

Finally, I would like to thank all staff of Ministry of telecommunication and IT at Palestine for their encouragement and support, and also my work colleagues for their support.

Table of Contents

List of Tables

List of Figures

List of Appendices

Abbreviations

COBIT	Control Objectives for Information and Related Technology
EUROSAI	The European Organization of Supreme Audit Institution
GovDB	Centralized Government Database of Palestine
ICT	Information and Communications Technology
IEC	International Electro-technical Commission
ISACA	Information Systems Audit and Control Association
ISO	International Organization for Standardization
IT	Information Technology
ITG	IT governance
ITGI	IT Governance Institute
ITIL	Information Technology Infrastructure Library
MTIT	Ministry of Telecommunication and Information Technology
OECD	Organization for Economic Cooperation and Development
OGC	Office of Government Commerce
PalTel	Palestinian Company for Telecommunications
ROI	Return on Investment
SPSS	Statistical Package for Social Sciences
SSO	Single Sign On
Takamul	Government Data Integration Committee, Palestine

Chapter One:
Background Context

1.1 Introduction

Today, Information technology (IT) has become a vital and integral part of every business segments. IT plays a significant strategic role in the management of organizations (Annwareen, 2008). In addition, IT assets (computer hardware, software, telecommunications facilities and human knowledge capital) have become essential for effective organizational management as they provide great value to business (Marshall & McKay, 2004).

Therefore, many organizations today would not be able to operate without a functional IT structure. Related to Downers & Ill (2013) the role of IT in setting strategic priorities and achieving business success is growing for companies around the world, according to new research published by CompTIA Association. More than three-quarters of businesses believes that IT is important or very important to their success; the majority plan solid increases in IT spending this year; and four in 10 have expectations of hiring new IT staff in 2013.

To be successful in business, IT infrastructure should be effectively managed in the organization because of the fact that "IT is now at the core of most organizations" to execute strategy (Symons, Cecere, Young, & Lamberd, 2005). Therefore, the organizations need to govern IT or "IT governance".

The definition of IT governance offered by the IT Governance Institute (ITGI) as the following; "IT governance is the responsibility of executives and the board of directors and consists of leadership, organizational structures and processes that ensure that the enterprise's IT sustains and extends the Organization's strategies and objectives" (ITGI, 2007:2). Another definition related to (Karen & Schwartz, 2007) is; "IT governance is putting structure around how organizations align IT strategy with business strategy, ensuring that companies stay on track to achieve their strategies and goals, and implementing good ways to measure IT performance. It makes sure that all stakeholders' interests are taken into account and that processes provide measurable results".

Effective IT governance provides a mechanism that allows the management information system and technology develop integrated business, IT strategic planning, allocates responsibility and priority of IT initiatives and making the right decisions at the right time as well.

Numerous IT governance standards/frameworks are emerged to achieve good IT governance, including ITIL (Information Technology Infrastructure Library), ISO 17799, and COBIT (Control Objectives for Information and Related Technology).

COBIT is the most complete guidance of best practices for IT governance framework (Hierrera & Kerta, 2012). The framework created by ISACA for IT management and IT governance. It is a supporting toolset that allows managers to bridge the gap between control requirements, technical issues and business risks and provides a comprehensive framework

2

that assists enterprises in achieving their objectives for the governance and management of enterprise IT. In addition, private and public industries, governments, accounting and audit firms have accepted the framework globally (ISACA, 2012).

COBIT 5 is the last version of COBIT released in April, 2012 (Wikipedia, 2013), divides IT governance into five domains: Evaluate, monitor and direct (EMD), Align, plan and organize (APO), Build, acquire and implement (BAI), Deliver, service and support (DSS), Monitor, evaluate and assesses (MEA), which are broken into 37 high-level processes and over 300 detailed controls covering a range of IT management and governance.

Organizations could perceive that implementing comprehensive IT governance framework as COBIT is too large task. Related to ISACA (2012:3) the organizations should select the most prioritized control objectives that fit with their goals and to reduce the number of IT governance audit measures.

This study aimed to examine prioritized high-level processes of IT governance to propose an abbreviated model of IT governance according to COBIT 5 to be applicable for Palestinian government.

1.2 Research Questions

The main questions have derived and investigated by the study, which are:

a. What are the most priority high-level processes of IT governance for Palestinian government sector?
b. What is the best model of IT governance according to COBIT 5 framework that applicable for Palestinian government sector?

1.3 Research Problem

Related to Symons, Cecere, Young, & Lamberd (2005) IT is now at the core of most organizations to execute strategy. Therefore, IT infrastructure should be effectively managed and the organizations need to put more effort into standardizing the IT structure, policies and procedures and focus on aligning them to the business objectives.

The governments have unique fundamental goals are expected to be delivered to a large number of citizens under budget constraints and on time. Performing under pressure is not new to public sector organizations as they continue to experience a shift in focus towards the cost-effective achievement of these goals with increased emphasis on IT to support the delivery of services. However, governing IT is not easy task as it is recognized to be a critical issue facing the public sector today (Al-Hatmi & Hales, 2010). Therefore, the organizations need to put more effort into standardizing IT aligning to the business objectives.

3

ISACA (2012:3) advice each enterprise to define its own process set, taking into account the specific situation. Gerke and Ridley (2006) suggest deriving an abbreviated COBIT framework concerning to the organization needs and goals

This study investigates the high-level processes of IT governance that are may considered most prioritized for Palestinian government sector, in order to define its own IT governance model that derived from COBIT 5 framework as a first step to standardize Palestinian government IT development processes. To achieve a good implementation of integrated IT governance framework in the Palestinian government.

1.4 Research Objectives

The study has several objectives including:

a. To identify IT governance concepts, areas and linkage with corporate governance and IT management.
b. To investigate the potential use of COBIT high-level processes as the basis of an integrated IT governance framework in the Palestinian government.
c. To provide recommendations and appreciate proposals to Palestinian government sector to supporting them by giving guidance to standardize and governing their IT efforts, in order to contribute achieving the Government ICT strategic goals and objectives.
d. To propose an abbreviated model of IT governance according to COBIT 5 that fit to applicable for Palestinian government sector.
e. To be a benchmark study to implementing good IT governance in Palestinian and regional governments sectors and similar contexts.

1.5 Research Significance

The research has its own significances on both practical and academic levels for many reasons. This study is considered the base point for standardizing IT governance in Palestinian government sector, in order to contribute to achieve the government strategic goals and objectives and improves the citizen's satisfaction.

The widespread internationally use of COBIT and the lack of scholarly publications around the framework should ensure the interest of those engaged in research with similar context.

Because the similarities in the government's culture and demographic in Arabian neighbor regions. The study can be a benchmark and generalized in neighbor regions

4

1.6 Research Limitations

The study has limited to Palestinian government sectors located in Gaza strip, Palestine.

1.7 Research Structure

Chapter One: Background Context
Chapter Two: Previous Studies
Chapter Three: An Overview of IT Governance
Chapter Four: Control Objectives Related Information Technology – COBIT 5
Chapter Five   IT Governance in Palestinian government sector
Chapter Six: Research Methodology
Chapter Seven: Results and Discussion
Chapter Eight: Conclusion and Recommendations

Chapter Two:
Previous Studies

2.1 Previous studies

2.2 Comments on previous studies

2.1 Previous Studies

2.1.1 "A Delphi Study into the Audit Challenges of IT Governance in the Australian Public Sector" (Al Omari, Barnes, & Pitman, 2013)

This study aimed to provide insight into the range of IT governance audit challenges currently facing Queensland public sector organizations and likely future challenges. Based on literature and Delphi research, this paper provides insights regarding the impact of, and required effort to address these challenges.

To address this goal, this research is built around these key questions:

What are the significant challenges and why they are important?
What are the perceived top ten IT governance audit challenges in the Queensland public sector?

This study has an exploratory focus as research in this domain is in its early stages in Australia and there has been little research material developed.

List of 30 IT governance audit challenges and issues were identified based on literature research and discussion with informants. The challenges were categorized into three logical categories, namely, Internal (N), External (E), and Organizational (O) audit challenges. Each category contains challenges that attributes to the category's label. Some of the identified challenges are regarded as having higher impact and/or easier to address than others. For examples: insufficient skills and competencies, and inadequate evaluation and testing of the effectiveness of IT governance controls. Other challenges are perceived as to have a fairly high impact but not easy to address. A good example is the lack of developed methodologies. Finally, some challenges are perceived as not having a high impact while others are perceived as not easy to address in the context of IT governance audit, such as slow or non-existent discovery if information is masked, inconsistent, or made unavailable by the audited organization. These challenges are less likely to come across in the conducting of IT governance audit.

This study revealed a list of top IT governance audit challenges may play an important role in preventing a successful outcome (inhibiting factors), specifically for the Queensland public sector in an effort to answer the second research question. This suggests that, in performing IT governance audit within a public sector organization.

2.1.2 "THE EVALUATION AND IMPROVEMENT OF IT GOVERNANCE" (Lorences & Ávila, 2013)

This study aimed to propose a general procedure to analyze, evaluate, monitor and improve the IT governance in an organization, considering the Business–IT alignment and risk management. The procedure integrates management tools such as business processes management, risk management, strategic alignment and the balanced scorecard. All this is complemented by the COBIT framework, expression of best practices in the IT governance

field. The structure and content of the phases proposed ensure the cycle of continuous improvement for IT governance. The evaluation phase integrates the best practices of the COBIT framework with tools of IT resources alignment and risk management, considering employee satisfaction, thus allowing a comprehensive assessment of IT governance in the organization. The design and implementation phases, based on the assessment and best practices, guide the construction of the IT governance process as a central proposal for improvement. The inclusion of a control phase is vital to ensure continuous improvement; this phase allows the monitoring, balancing goal and performance indicators that ensure proactive improvement actions.

The concepts and ideas presented in this study had been applied in four case studies, verifying their implementation feasibility. The results indicate a low level of IT governance and the existence of several problems primarily in the Plan and Organize and Monitor and Evaluate domains.

2.1.3 "Towards a method for assessing IT governance of organizations" (Son, 2012)

This study aimed to develop an assessment method of IT governance. Structures, processes & relations, strategic use of IT and control had considered the most important elements of IT governance. The research had combined them together which makes possible to study IT governance. The elements were converted in criteria for developing the assessment method. IT governance matrix of Weill and Ross was selected to describe IT governance structures and IT governance mechanism of De Haes and Van Grembergen was selected to describe IT governance processes and relations. Business/IT alignment measurement of Luftman was selected to measure IT governance effectiveness. The proposed IT governance assessment method was provided by theoretical guidelines for organizing IT governance for which IT decisions should be made and reviewed by which hierarchies. Therefore, gave recommendations on which IT governance mechanisms should be implemented, how many for each IT decision and how mature they should be.

The IT governance assessment method was applied to two large financial organizations to validate whether the method can be usefully used in practice.

The main findings were that the organizations differed in the way some IT decisions were made and reviewed. The organization that has outsourced most of its IT did not review IT strategy decision. However at the organization that maintains most of its IT internally, IT strategy decision was reviewed by top management and even reviewed by the board of directors. Also at this organization major IT investment decision was made by top management itself supported by senior IT management whereas at the other organization senior IT management made a major IT investment decision.

8

2.1.4 "ASSESSMENT OF IT GOVERNANCE USING COBIT 4.1 FRAMEWORK METHODOLOGY: CASE STUDY UNIVERSITY INFORMATION SYSTEMDEVELOPMENT IN IT DIRECTORATE BINUS UNIVERSITY" (Hiererra & Kerta, 2012)

This study aimed to assessing the information system department in IT directorate BINUS University from an IT governance perspective.

The purpose of this research project is to conduct a focused evaluation using a COBIT IT governance framework to determine the IT governance maturity of the UNIV IS Development Department and suggest measures for improvement. The study problems are:

1. What is the IT governance maturity level at information system department and what does it mean?
2. How can the overall IT governance maturity be improved?

The IT governance framework COBIT has guided the theory for IT governance throughout this study. The author select eight COBIT IT processes that related to subject research and analyze the overall maturity level for the information system department in IT Directorate BINUS University. The maturity levels come from the COBIT maturity levels for each process. Eight IT processes according to COBIT were selected in the study, which are:

PO1 – Define a Strategic IT Plan
PO10 – Manage Projects
AI6 – Manage Changes
DS1 – Define and Manager Service Levels Management
DS5 – Ensure Systems Security
DS11 – Manage Data
ME1 – Monitor and Evaluate IT Performance
ME4 – Provide IT Governance

The IT governance maturity information system department obtained the score 3.163 out of 5.00. The results demonstrate that the information system department has many practices in place that meet maturity requirements for the IT governance framework. Though the information system department has not created or adopted an IT governance framework, many of the processes in place match practices in COBIT IT governance framework processes.

The study recommending that the information system department can better utilize IT resources by improving IT governance as the university continues to grow and develop.

2.1.5 **"Optimizing COBIT 5 for IT governance : examples from the public" (Al Omari, Barnes, & Pitman, 2012)**

This study aimed to define an optimized sub-set of COBIT 5 suitable for IT governance audit in the Australian public sector. The additional study aim is to compare the findings of this research with previous international and national studies to give an indication of the applicability of the optimized sub-set across different geographical and organization at contexts.

A survey methodology was employed. The surveys had sent to 112 responders by emails were distributed containing a link to the online questionnaire. Fifty seven participants completed the survey and rate the 37 high-level control-objectives from the COBIT 5 framework according to their importance to public sector organization on the same scale.

The optimized sub-set consisted of control-objectives from four domains: EDM, APO, BAI and DSS. The surveyed organization s did not consider any control-objectives from the MEA domain to be of high importance which indicates that this domain is heavily undervalued. Notwithstanding the importance of all domains, rankings were important to determine the composition of the optimized sub-set. Three control-objectives (25%) were selected from each of the domains EDM and APO while only one (8%) control-objective was selected from the BAI domain and five (42%) from the DSS domains.

Twelve control-objectives were identified as being most important to Queensland public sector organizations. Which are; EDM02: Ensure Benefits Delivery, APO02: Manage Strategy, EDM03: Ensure Risk Optimization, APO12: Manage Risk, BAI06: Manage Changes, DSS03: Manage Problems, DSS02: Manage Service Requests and Incidents, DSS04: Manage Continuity, APO13: Manage Security, DSS05: Manage Security Services, DSS01: Manage Operations and EDM01: Ensure Governance Framework Setting.

2.1.6 **"A Comparison between IT Governance Research and Concepts in COBIT5" (Preittigun, Chantatub, & Vatanasakdakul, 2012)**

This study aimed to investigate and compare concepts in academic literatures to COBIT 5. This study reviewed and analyzed Information Systems (IS) literatures that adhere to IT governance. The study identified 100 articles that published in accredited journals during 2002 to 2012. The founded articles analyzed and classified based on COBIT5 governance and management areas. The study classification demonstrated three research focus areas. Almost two-third of identified articles, 58%, shows relationships to COBIT 5 governance area. These literatures concern on the design, implementation and human aspect of IT governance. Some of the papers are related to management areas, especially APO and MEA, which relates to planning, design and implementation, as well as, monitoring and feedback to governance area. On the other hand, BAI and DSS are not found in IT governance articles.

Around seventh-tenth of articles are empirical while the rest are conceptual papers. Many empirical articles adopt case study as the main methodology. There are a small number of articles that use interview or panel study. Alternatively, there are about one-third of these articles that use survey to solicit data. Additionally, there are three articles that adopt mixed methods which use both quantitative and qualitative tools research articles relate to more than one area.

Then, the study compared the finding from these articles to the concepts proposed in COBIT 5. There are both similar and different viewpoints. COBIT shows similarity in EDM areas; for instance, it recognizes the importance of setting up governance system (EDM01), it still focuses on delivery of business value (EDM02) and it concerns on risk and resource management (EDM03, EDM04). COBIT 5 clarifies the and also suggested some interesting researches on several key areas that should be conducted for better understanding of IT governance. Finally, the study mentioned that there's no empirical evidence of COBIT 5 implementation.

2.1.7 **"The level of information technology governance in KULACOM-Jordan Company" (Al Skafy & Al- Theebeh, 2012)**

The study aimed to investigate the level of IT governance in KULACOM- Jordan Company using COBIT5 framework. The problem of the study can be summarized in the following question:

What is the level of IT governance available at the KULACOM-Jordan Company?

And one hypothesis has been constructed that showed that there is good governance over IT in the KULACOM -Jordan Company.

One hundred and fifteen Questionnaires were distributed to all KLACOM Jordan employees, and 100 questionnaires were valid for analysis.

Depending on the statistical analysis the following results has been shown:

a. There is IT governance in a moderate average in the KULACOM-Jordan Company.
b. There are "Evaluate, Direct and Monitor" and "Build, Acquire and Implement" in highly degree in KULACOM-Jordan Company.
c. There are "Align, Plan and Organize", "Deliver, Service and Support", and "Monitor, Evaluate and Assure" in moderate degree in KULACOM-Jordan company

The author recommended the researchers to apply such study on other samples or sectors, such as hospitals, municipalities, courts and banks.

2.1.8 "IT governance in the public sector: 'top-priority'" (Wijsman, Neelissen, & Wauters, 2011)

This study considered IT governance as a 'top priority'. It was to The Netherlands Court of Audit. The study emphasized the key play role of IT staff to stimulate senior managers to assume responsibility for major topics regarding IT. And support them from with issues regarding planning and control, business alignment, risk management and budget management. And linking strategic IT governance concerns with issues in the area of management of IT processes. Also, role of IT staff to induce a change of mindset of executive managers about IT staff. The study identified the deployment of IT as a strategic issue to give a rough sketch of the development of IT governance as part of a wider governance movement. Then, is has present conception of the term IT governance from researcher point of view. The study proceeded with an account of a descriptive study by the Netherlands Court of Audit in the area of IT governance.

The study considered five components of IT governance which is the strategic planning, internal control of the organization's deployment of IT, external accountability, and external supervision of the organization's deployment of IT. The fifth component is setting and supervision activities concerning the deployment of IT by non-departmental public body (NDPB).

2.1.9 "IT governance maturity according to COBIT: a case study of Kenya Methodist University (KEMU)" (Mwangi, 2011)

This study presents a case study of an assessment of IT governance maturity at the Kenya Methodist University (KEMU) using the COBIT framework.

The results of this assessment showed that KEMU "s IT governance maturity level is 1.8 out of maximum possible score of 5.

This study recommends that in order for the institution to get an IT governance maturity level of 5, the university will need to perform each activity in an optimized manner as described in the COBIT maturity model, use all the suggested metrics, all documents, and have the same role assignment as the one suggested by COBIT.

2.1.10 "AN ASSESSMENT OF THE IT GOVERNANCE MATURITY AT SL" (Castillo, 2011)

The purpose of this study was to evaluate the IT governance maturity at IT department of AB Storstockholms Lokaltrafik (SL) using COBIT and to identify problem areas and suggest measures for improvement. A framework for the assessment of the IT governance maturity at SL was developed based on the IT Organization Model Assessment Tool (ITOMAT), a formalized method for assessing the IT governance maturity. Two questions were constructed to conduct the research:
What is the IT governance maturity level at SL?
How can the overall IT governance maturity be improved?

12

The author followed triangulation method of data collections using interviews and surveys.

The study revealed that the maturity scores for the different domains are relatively stable with some minor deviations. The domains maturity scores are laid between the levels Repeatable but Intuitive (2) and Defined Process (3).

The Acquire and Implement (AI) domain gained the highest maturity score. The score of 3,04 is quite higher than the total IT governance maturity score of 2,68 for the enterprise. The Deliver and Support (DS) domain is not far behind with the maturity score 3,01. The domain Plan and Organize (PO) obtained the maturity score 2,44. Monitor and Evaluate (ME) domain obtained the lowest maturity score of the four domains. Its maturity score of 1,81. By calculating the mean value scores of COBIT domains, The enterprise IT governance maturity of SL were obtained the score 2,68 out of 5,00. This means that the IT governance of SL laid between the levels Repeatable but Intuitive (2) and Defined Process (3).

2.1.11 **"An information technology governance framework for the public sector" (Terblanche, 2011)**

The purpose of this study was to assist public sector entities in their IT governance efforts through the development of a framework to be used to govern IT effectively the public sector of South Africa to assist the public sector entity in governing the IT environment unique to this industry and; to equip public sector management with a framework to govern IT more effectively, while under pressure of public scrutiny.

The research recommended using principles 5.2 and 5.3 of the King III report, highlighting the need for a governance framework to achieve alignment between the business needs and the IT environment in the public sector.

The paper advised to take two aspects those public sector entities should consider in terms of governing IT; consider the nature, organizational structure and IT environment of the entity, and Top-bottom rather than bottom-top frameworks.

2.1.12 **"IT GOVERNANCE MATURITY AT INDONESIAN STATE OWNED ENTERPRISES: CONTINGENT F ACTORS & IMPACTS" (Wibowo, 2011)**

This study aimed to find out what drives, enables and inhibit companies in implementing good IT governance, as well as the effect or influence those three factors have towards IT governance maturity level. In addition, this study also wanted to confirm whether with good IT governance, the value of IT investments can be perceivably felt by the organization, and whether the IT risk can be mitigated.

The general approach of this research used quantitative paradigm, although at an early stage also used qualitative approaches.

Survey was conducted 103 State Owned Enterprises (SOEs) by using questionnaires collected by field workers, though some were delivered electronically.

The study found that major IT governance drivers include external audits, free market competition, corporate governance regulations and core system/enterprise-wide ERP implementations. The IT governance enabler proven is 'high awareness of risk management amongst staff. Also, the larger the number of the drivers or enablers, the better the IT governance. Inhibiting factors of IT governance do not play part in influencing IT governance maturity level.

This study also demonstrates that implementation of IT governance is the answer to organization's need to ensure IT value creation and may influence bottom-line SOE's performance. However in this research, we are unable to prove that IT governance can lower IT risks.

2.1.13 "An exploratory case study of governance practices for information technology projects in a government linked company" (Jaafar & Jordan, 2011)

This study analyzed and presented a case study on information technology governance practices in a government-linked company (GLC) by looking at the IT governance process, accountability and the desirable behaviors of IT at the project level of the organization. The main research question and derived questions for this study are:

How IT governance practices are implemented in the context of a GLC in Malaysia?
What IT decisions are made at the IT project level and how?
How does IT governance enhance the accountability of IT decision makers in achieving a desirable outcome at the project level?

Data for the study was collected using a combination of semi-structured interviews, documentation analysis and observation techniques to provide an in-depth and rich understanding of IT governance practices in the organization.

Twelve IT project managers selected to be the responders, their names were obtained from the general manager (GM) of the IT services and control (ITSC) division.

The study reveals a number of important findings in the context of IT governance implementation at the project level. As far as IT governance documentation was is concerned, there are numerous standards currently available of which many are continuously undergoing further development by IT professionals. Nonetheless, there is still no one correct way of governing IT in an organization, more specifically, in IT project management. In addition, there is not much known concerning the IT governance outcome of IT governance practices in Malaysian organizations. Thus, this study shares the level of readiness and awareness of IT governance practices, for this particular case, when it comes to implementing IT projects.

14

2.1.14 "IT Governance using COBIT implemented in a High Public Educational Institution – A Case Study" (RIBEIRO & GOMES, 2009)

This study presented a case study of the implementation and use of COBIT for IT governance in a high public educational institution of Portugal as a part of the applicability of the quality management system the implementation of the ISO 9001 standard certification. First to ensure the certification and next to implement mechanisms to make the IT governance especially to manage and control the IT and IS.

The study showed that with the implementation of COBIT the institution has improved the quality of care by the administrative services, controlled and managed the IS more efficiently, defining processes and indicators to do it, reduced the tasks execution time, reduced in about 90% of the number of failures in communication between services and user, helped to define specially indicators to evaluate the performance of the services in IT field, it was able to set policies and plans for managing the IT, reduced the execution time of tasks in about 25%, more efficiency in monitoring and control the technological infrastructure components, reduced about 30% in the number of incidents resolved and finalized by the various departments of IT and reduced more than 10% the number of incidents reopened. Furthermore, the study recommended that some issues must be guaranteed like: the need for continuous training on the COBIT especially for those collaborators with less receptive to the change process and the need to exist an IS to support the COBIT documentation (and other standards ex. ISO 9001), and to allow the automatic achievement of indicators. In summary we conclude that COBIT is a suitable framework for the implementation of the ISO 9001 certification standard and for IT governance in educational institutions in the IT field.

2.1.15 "Exploring COBIT Processes for IT governance in Saudi Organizations: An empirical Study" (Abu-Musa, 2009)

The objective of this study is to investigate the formality, auditing, responsibility and accountability of implementing COBIT processes for IT governance in Saudi organizations.

The study attempted to answer the following research questions:

a. Who performs COBIT processes in Saudi organizations?
b. Who is accountable for the COBIT processes in Saudi organizations?
c. Are the COBIT processes and their controls formalized in Saudi organizations?
d. Are COBIT processes audited in Saudi organizations?
e. Are there any significant differences among Saudi organizations regarding the adequacy of implemented COBIT domains and processes?
f. Are there any significant differences among respondent groups regarding
g. Are there an adequacy of implemented COBIT domains and processes in Saudi organizations?

15

An empirical survey, using a self-administered questionnaire, was conducted to achieve these objectives. Five hundred questionnaires were distributed to a sample of Saudi organizations in a selected number of Saudi cities. One hundred and twenty seven valid questionnaires – representing a 25.4 percent response rate –were collected and analyzed.

The results of the study reveal that the majority of respondents reported that IT departments have the responsibility of implementing COBIT processes and domains in their organizations. Most of the respondents reported that the IT COBIT processes and domains are neither audited nor formally conducted in Saudi organizations.

The study intends to develop a roadmap for Saudi organizations which are looking forward to compliance with COBIT and adoption of IT governance principles. It is recommended to extend the scope of the current study to other countries in the Middle East (e.g. Egypt) and Gulf countries (e.g. Bahrain, Kuwait, Qatar, and United Arab Emirates) to explore the potential influence of cultural and other differences on their perception of the importance and implementation of COBIT processes in their organizations.

2.1.16 "The State of IT Governance in the Top 20 IT Spending Companies in South Africa" (Motloutsi, 2009)

The aim of this study was to investigate the status of IT governance in the top 20 IT spending companies in South Africa. This descriptive study examines how IT governance is being implemented through number of IT governance practices and assesses the maturity levels of IT governance in the Top 20 IT spending companies. The paper also focused on how internationally recognized standards such as COBIT and ITIL are being utilized.

The study revealed that were only few companies, about a quarter, have matured levels of IT governance. In these companies, IT governance processes are managed and measured. Another finding was; most companies do not measure the levels of IT governance maturity, but most companies are uses ITIL and COBIT frameworks for implementing governance. However the levels of IT governance maturities in some companies, especially government owned organizations, are still low.

The study recommended that; companies must continuously assess their IT governance maturity levels as a continuous process. COBIT can assist organizations to implement a detailed program of IT governance structures.

2.1.17 "The IT organization modeling and assessment tool: Correlating IT governance maturity with the effect of IT" (Simonsson & Johnson, 2008)

This study aimed to propose a method for IT governance maturity assessment within an enterprise based on COBIT. This method can thus be viewed as an extension of COBIT. It is named the IT Organization Modeling and Assessment Tool (ITOMAT).

The paper identified a set of requirements that a method for IT governance maturity assessments should fulfill within the domains of validity, reliability and cost, which are:

RQ1: Consistency with common conceptions
RQ2: Descriptive operationalization
RQ3: Normative operationalization
RQ4: Support for efficient data collection
RQ5: Support for efficient analysis.

The study mentioned that the COBIT performs weakly with respect to requirements RQ3 to RQ5. ITOMAT leverages the benefits of COBIT and overcome operationalization and subjectivity weaknesses in COBIT. The method contains two parts:

a. The modeling language; that provides a descriptive representation of how IT is governed within the assessed company.
b. The analysis framework; that provides support for the evaluation of whether the given IT governance structure is good or bad.

ITOMAT has been applied to assess IT governance maturity in four case studies. Simultaneously, external metrics of the effect of IT were collected and correlated to the maturity levels. A Bayesian network representing the relation between internal maturity of IT processes, and the effect of IT is outlined. Such network can be used either to define which IT processes really affect the quality of IT, as seen from the business point of view, or to make quick assessments of IT governance maturity by assessing just a few processes. As more data is collected, the network will become truly useful. The model can be used to predict the effect of IT given the maturity levels of IT processes.

2.1.18 "High Level Control Objectives in the Malaysian Ministry of Education" (Ismail, Alinda, Ibrahim, & Abd. Rahman, 2008)

This study examined the potential use of COBIT high-level control objectives or IT processes as the basis of an integrated IT governance framework in the Malaysian Ministry of Education. The outcome of this study is an abbreviated list of COBIT's high level control objectives which will serve as the basic building block for an integrated IT governance framework in the Ministry of Education.

Mail survey method had used to determine 20 high level control objectives that were considered to be most important to each organizational level in the ministry. The analysis showed that the focus on IT governance domains differs between the divisions and departments in the ministry which operates at the strategic level with the other organizational levels. At the ministerial level, the main focuses are on Plan and Organize and Acquire and Implement domains. At the other organizational levels, focuses are on Plan and Organize and Monitor and Evaluate. At the school level, the Monitor and Evaluate domain is given the greatest emphasize. Across these organizational levels, the Acquire and Implement domain is given the least focus. The study found four IT processes are unique to Malaysian Ministry of Education were also identified.

2.1.19 "An IT maturity study within the Swedish non-profit governmental municipals using the COBIT framework" (FRÄSÉN, 2007)

This thesis includes a case study of seven Swedish municipals, focusing on assessing the IT maturity with the COBIT framework using the IT Organization Modeling and Assessment Tool (ITOMAT) that designed by KTH university and comparing these results with a Microsoft customer survey regarding the application platform as well as trying to relate them to a performance grade.

Interviews and questionnaire-based surveys were performed for collecting information of the study to find answer of research questions that had been assembled, which are:

How does IT maturity compare to municipal performance?
How does IT maturity compare to the APO results?
How does the municipalities compare to companies?

According to the results, the study showed that there is no correlation can be proved between performance and maturity within IT. The results determined that the IT maturity of municipals corresponds to that of large companies, and outclass that of smaller companies. In specific, municipals have a high level of organizational planning and cost control and are top performers within managing service desk and incidents.

When comparing the results of the COBIT process AI2 ("Create and Maintain Application Software") with APO results, a high correlation was exists. This proves that the APO and the AI2 provide a good measure of the same objectives.

When comparing the results of municipals in the study to the results of companies in previous studies, the study mentioned that is possible to say that municipalities have the same maturity within IT as large companies. Smaller companies have a much smaller maturity. There should be noted though, that these figures are of a relative small statistical base, consisting of seven municipalities, six large companies and five small companies.

2.1.20 "Assessment of IT Governance - A Prioritization of Cobit -" (Simonsson & Johnson, 2006)

The purpose of this study was to illustrate the differences in priority of IT governance concerns between literature, practitioners, and COBIT. The research is conducted within the Enterprise Architecture Research Program (EARP) at the Royal Institute of Technology (KTH) in Stockholm, Sweden. Within EARP, Architecture Theory Diagrams, ATD, are used as an approach to analyze various fields within the enterprise architecture domain.

The study presented an ATD and a framework for definition for IT governance based on a study of 60 studies and articles. The authors defined IT governance as: is the preparation for, making of and implementation of IT related decisions regarding goals, processes, people and technology on a tactical or strategic level. Priorities in literature and of IT governance

18

experts were mapped onto the framework for definition. A case study was carried out in order to prioritize COBIT.

Results show that the major differences exist within the priorities of the decision-making phases: COBIT emphasizes Monitoring of decisions while practitioners are trying to improve their Understanding of organizations and IT.

2.1.21 "Towards an abbreviated COBIT framework for use in an Australian State Public Sector" (Gerke & Ridley, 2006)

The aim of this study is to identify the most important high level control objectives from the COBIT framework for the Tasmanian public sector and compare the observed results with similar of previous studies findings conducted both internationally and within Australia and in a range of organizations, to give an indication of the applicability of these control objectives across different geographical and organizational contexts.

The study involved the development and administration of a survey instrument to the target participants. The survey scope encompassed 30 public sector organizations and 25 responses of them were received giving a response rate of 83%.

The study identified an abbreviated list of 17 high level control objectives from the COBIT framework that were considered to be important to Tasmanian public sector organizations. The abbreviated list was derived from three of the COBIT domains: Planning and Organization, Acquisition and Implementation and Delivery and Support. No control objectives from the Monitoring domain were considered by the surveyed organizations to be of a high level of importance. Eight of these processes were also identified by three other authors as being important in other contexts.

2.1.22 "Investigating COBIT for Information Technology Audit in the Tasmanian Public Sector" (Gerke, 2005)

This research aimed to evaluation of the IT audit process using COBIT for the Tasmanian public sector.

The research questions that answered by the study were:

a. Which of the high level control objectives from the COBIT framework do Tasmanian public sector organizations perceive to be the most important?
b. How feasible is it to use an instrument derived from COBIT to conduct IT audits in the Tasmanian public sector?

The instrument developed contained seven IT control objectives and was successfully trailed in nine public sector organizations of all possible levels. The results obtained indicated that Tasmanian public sector organizations perceived ensuring security of their systems to be the most important IT process. Of the seven it control objectives audited, five were also considered important in national and international studies. The results obtained suggests that

19

use of the COBIT -derived instrument for public sector IT audit provided a insight into the IT governance and control within these organizations as well as indicating the degree to which the goals and governance of the organization and the organization were aligned.

2.2 Comments on previous studies

After reviewing previous studies, noticed that there are few scholarly available in the field of IT governance. In addition, most of the past literatures and studies of IT governance were published in recent years and still in early stages. This suits with the novelty of this research.

Past literature reviews indicate different viewpoints aspects and conceptual diversification of an IT governance field studies. Five focus areas could be demonstrated from previous studies. First area of the studies were aimed to investigate and examine the relationships between IT governance implementations and its impacts on management aspects, business IT alignment, and performance indicators. The second studies were aimed to assess and evaluate existence level of IT governance in the organizations based on COBIT framework, but some of studies proposed new assessment models of IT governance, that suitable with their organizational contexts. Third area of studies were aimed to provide insight into IT governance frameworks as an internal control and audit tool, specially, for IT processes. Fourth area studies aimed to use case study methodologies to conduct IT governance and to investigate the maturity level of IT governance. ISACA recommends to select the prioritized It governance processes as a first step for implementing IT governance. Therefore, it is logical to find many research articles where aimed to define an optimized sub set of COBIT that suitable for IT governance implementation in the research organizational contexts.

Additionally, almost all of research articles are conducted in developed countries. Whereas still scarcity articles found that conducted in developing countries. This may not surprising since it is common that developed countries to have regulations directly relates to IT governance (e.g. SOX and alike) while developing countries do not.

This research is considered complements the IT governance research studies. This study may similar with the study researches that identifies the prioritized processes of IT Governance. But, the originality of this research is that the first Palestinian study which addresses the Palestinian situation, contributes to investigate prioritized IT governance processes, focused the Palestinian government sector in Gaza. Furthermore, this study based on latest and the most prevalent IT governance framework; COBIT 5. To propose an abbreviated model of IT governance as a starting point to standardize implementing IT governance for Palestinian government sector.

Chapter Three:
Theoretical Framework

3.1 Definition of IT governance

There is no single definition for IT governance. Numerous authors and institutes provided their own definitions of IT governance. Gartner IT Glossary defines IT governance as the processes that ensure the effective and efficient use of IT in enabling an organization to achieve its goals (Gartner IT Glossary, n.d.).

Weill and Ross (Weill & Ross, 2004) define IT governance in their IT governance research at 250 organizations as specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT.

According to De Haes and Van Grembergen (2004) IT governance is the organizational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and the fusion of business and IT.

IT governance Institute that has developed COBIT to control IT processes define IT governance as the responsibility of the board of directors and executive management (including IT). It is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives (IT governanceI, 2006).

Webb, Pollard and Ridley have compared 12 definitions of IT governance found in the literature and have constructed a definition for IT governance in their paper: IT governance is the strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management (Webb, Ppllard, & Ridely, 2006).

Overall, the definitions attached to IT governance by the various authors are very similar. They all focus on the same issues of achieving the link between businesses, ensuring that an organization's mission is supported by IT, thereby ensuring strategic alignment. Moreover, IT governance ensures that IT benefits are maximized, IT is in harmony with the organization, IT resources are used responsibly, and IT risks are managed.

This study derive its definition of IT governance as:

"The responsibility of senior and executive management to align and integrate IT with business to enable the organization to achieve their objectives and strategies through the effective and efficient use of information technology"

3.2 Importance of IT governance

Today, IT has become a critical driver of business success. IT demands thorough and thoughtful board governance, yet such oversight has often been lacking because IT has been seen as an operations matter best left to management, and board members lacked interest or expertise in technology issues (Grembergen V. , 2004). Despite that IT

22

governance is necessary since the average organizations spend a lot of money on IT. In 2012, Gartner collected IT Key Metrics Data from 2,295 public and private enterprises from more than 80 countries in 21 industry sectors, the study showed more than 4.1% of the average enterprise's revenues have spent on IT in 2012. The average of IT staff was 6.35% of total employees. Each employee had spent average of $12,000 in 2012. Therefore, according to the Gartner forecast (STAMFORD, 2013) average IT spending of government organizations at total $449.5 billion in 2013.

This introduction probably demonstrates that IT governance is probably one of the most fundamental criteria an organization should undertake to develop a competitive advantage. The Scottsdale Institute (2001) highlights the importance of closing the IT governance gap, by illustrating the complexity and risk of excluding an IT strategy from an organization's overall strategic mission.

Ward and Peppard (2002) highlighted to number of reasons for implementing IT governance. Firstly, organizations today depend strongly on IT to deliver key information to the organization, as well as to support business transactions. Secondly, the vast amount of cyber threats has led to an increase in organizational vulnerability. Thirdly, as a result of larger investments, IT has become an important resource that requires proper governance. Finally, the purchasing of IT does not in itself add any benefit to an organization; however, the efficient use of this resource adds great value.

Symons C. (2005) concurs by highlighting that strategic alignment begins and ends with good IT governance. He further mentions that IT governance is about optimizing investments in IT, with optimization implying that these investments are aligned with the overall business unit strategies. He provides a detailed description of what good IT governance structures promote:

"Good IT governance ensures that IT investments are optimized and aligned with the business strategy, delivering value within acceptable risk boundaries, taking into account culture, organizational structure, maturity and strategy" (Symons C. , 2005).

Weil and Ross (2004) highlight some reasons why an organization should try to implement effective IT governance. First of all, good IT governance pays off. A study that they did showed that firms that were successful in their IT governance had more than 20% higher Return On Assets (ROA) than similar firms with the same strategy but with ineffective IT governance. Another reason is that IT is expensive and it is therefore important to focus on strategic priorities. Next reason for an effective IT governance is to prevent hidden IT spending. They showed that the value an organization generates from IT is ultimately based on the effectiveness of IT governance. Since there is a significant difference in the way in which organizations apply IT governance.

Guldentops (2003) illustrates the difference between strong and weak IT governance as the following:

Strong IT governance disciplines are more likely to lead to the effective use of technology to enable and support the business, resulting in higher levels of control and security, greater integrity of financial and management information, and therefore reduced audit risk. Where weak IT governance disciplines are more likely to lead to

23

ineffective or incomplete use of technology, thus increasing the risk of poor control and security, and reducing the integrity and reliability of management and financial information, therefore increasing audit risk.

In governments, the most important aspect is the delivery of a specific service to the citizens in order to improve the quality of life for all (Wood, 2010). The particular services need to be delivered in a sustainable way. This is however only possible if public sector are able to utilize their IT assets in a modern and effective way, to reap the required benefits. Local authorities are obliged to improve service delivery, be cost-effective and keep up to date with innovative technology trends. Therefore, implementing an IT governance framework is increasingly important to public sector organizations as they seek to consolidate infrastructure and IT operations, cut costs amid strained municipal budgets and, above all, improve service to residents. These efforts are part of a larger trend in the public sphere to integrate computed.

IT governance model has already seen some success in California Sate at United States of America. Since introducing its new governance framework and IT operations consolidation strategy in 2007, the state has saved upwards of $400 million (Lebeaux, 2010).

Overall, the final goal of good IT governance is rather to provide the business with the support needed to conduct business in a good manner. Extensive research conducted by the ITGI (2003) led to IT governance standards being developed because of IT's complexity and the intangible value of information. These governance standards make the governing of IT easier and more structured.

3.3 Corporation Governance and IT Governance

To be able to make a deeper understanding of IT governance and its role within an organization it is necessary to look at a broader view which can be done through viewing the corporate governance and the connection between corporate governance and IT governance.

The Organization for Economic Cooperation and Development's 2004 published the "OECD Principles for Corporate governance" which defines corporate governance as providing the structure through which the objectives for the company is set and the ways to align and achieve those objectives and monitor the performance is determined. It also set the relationships between an organization's, corporate governance establishes a set of relationships between a company's management, its board, its shareholders, and other stakeholders. Furthermore corporate governance is defined as something that provides structure for determining organizational objectives and monitoring performance to ensure that objectives are determined (OECD, 2004). Within some nations, it is statutory to have a supervisory board, whose purpose is to protect the shareholders and other stakeholders, such as employees, customers and creditors. This board and the senior management team work with implementation of governance principles and this makes it possible to ensure effectiveness of organizational processes.

ITGI (2007) listed the main responsibilities of corporate governance are:

a. Taking stakeholder values into account when setting strategy
b. Giving direction to the processes that implement the strategy
c. Ensuring that processes provide measurable results
d. Being informed about the results and challenging them
e. Ensuring that the results are acted upon
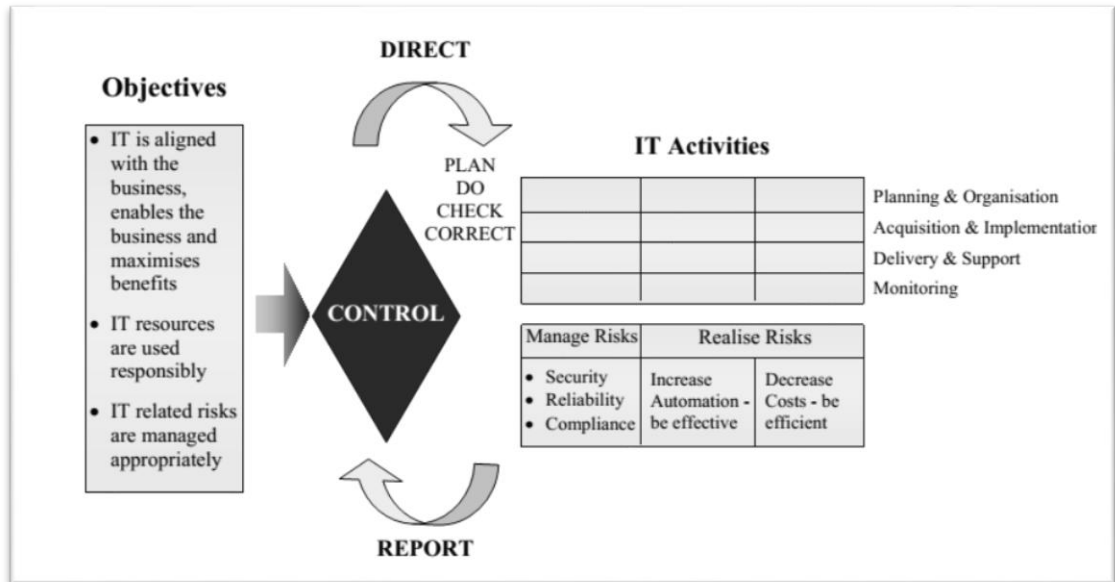
Figure (3.1): IT governance
Source: (ITGI, 2003)

IT governance concentrates on the IT portion of the enterprise governance. IT Governance Institute (2007) describes IT governance model as follows. Firstly, IT is governed by a set of practices to ensure that the organization's information and related technology support its business objectives, that its resources are used responsibly and that its risks are managed correctly. The practices provide direction for the IT activities. Secondly, IT governance ensures that IT risks are managed and value is realized. Thirdly, the outcomes of IT activities need to be reported. Finally, the IT activities are measured against various practices and controls, and the cycle thus begins again by providing direction for the IT activities.

IT governance involves the strategic application of the corporate governance principles to direct and control IT, and should explicitly stress (ITGI, 2007):

a. The potential of IT to leverage and influence intangible assets (information, knowledge, trust, etc.)
b. The alignment of IT and business strategies
c. The review and approval of IT investments
d. The assurance of IT-related risk transparency
e. The measurement of IT performance

Since corporate governance and IT governance differ, it is important that a distinction between the two be made. Guldentops (2003) defines corporate governance as the rules and processes which enable the recognition and management of business

25

opportunities and risks, to ensure enhanced and sustainable stakeholder value. He further defines IT governance as the management processes which ensure the delivery of the expected benefits of IT, in a controlled manner to support current operations and help enhance the long-term sustainable success of the organization.

Ultimately, IT governance closely relates to corporate governance, the structure of the IT organization and its objectives and alignment to the business objectives. Corporate governance issues cannot be addressed without considering IT governance issues (Grembergen & Guldentops, 2004).

3.4 IT Governance and IT Management

The differences between IT governance and IT Management are not always clear. Weil and Ross (2004) mean that governance determines who should make decisions and management is the process of making and implementing the decisions. According to Grembergen (2004) IT management is focused on the internal effective supply of IT services and products and the management of present IT operations. The responsibility within IT governance is much broader than IT Management and is focused on performing and transforming the IT in the organization to better meet present and future demands from the business (internal focus) and the business customers (external focus).

The differences between IT governance and IT management according to Grembergen (2004) are illustrated in Figure (3.2). In doing so, insights that governance has a wider time dimension and looks further than the organization as such
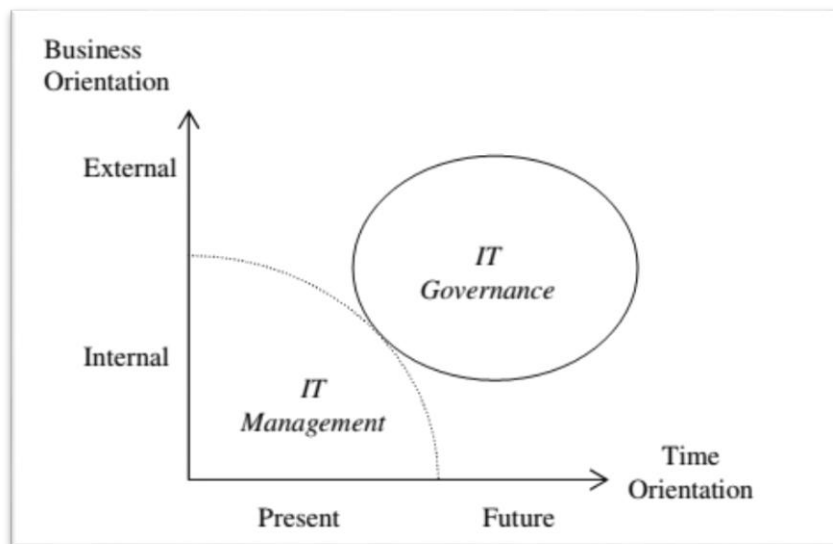
Figure (3.2): Positioning of IT governance and IT Management
Source: (Grembergen, 2004)

26

3.5 IT Governance Areas

The IT governance Institute (ITGI, 2003) indicates that IT governance attempts to accomplish two things: IT's delivery of value to the business and mitigation of IT risks. The first one is driven by strategic alignment and the second is driven by embedding accountability in the organization. Both need to be supported by adequate resources and measured to ensure that the results are obtained. Hence, there are five main focus areas for IT governance; all driven by shareholder value. Two of the five focus areas are outcomes: risk management and value delivery. Three of them are drivers which are: performance measurement, resource management (which overlays them all) and strategic alignment. This was illustrated in Figure (3.3).
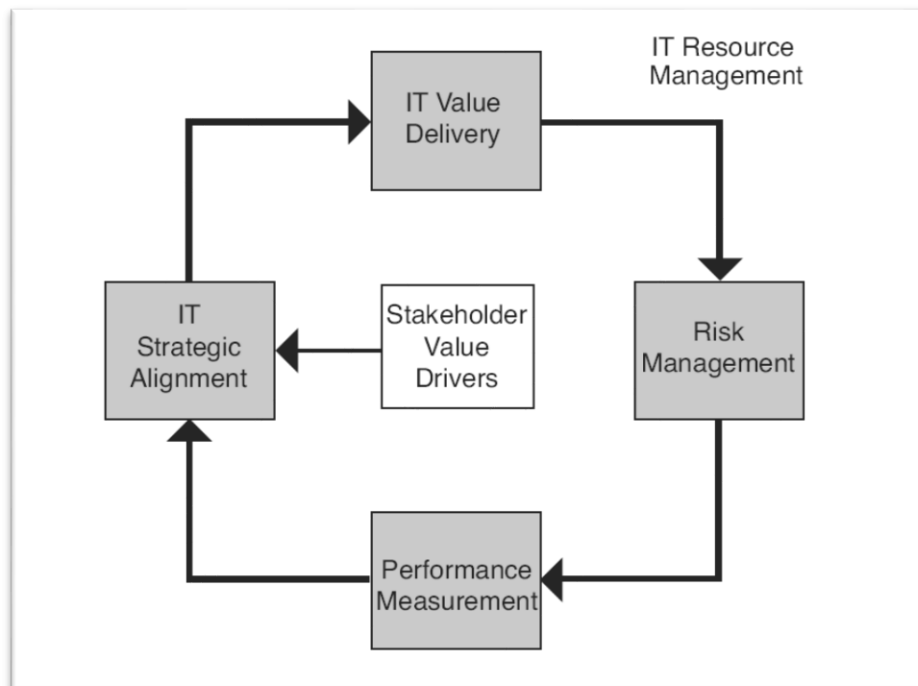
Figure (3.3): Focus Areas of IT governance
Source: (ITGI, 2003)

IT governance Institute (ITGI, 2003) depicts IT governance as a life cycle that is never ending and which can be accessed at any time. They illustrate the steps of the cycle as follows: firstly, one begins with aligning the strategy throughout the organization; secondly, implementing the strategy to ensure that expected value is delivered and that risks are mitigated; thirdly, the strategy should be monitored at regular intervals and the results measured, reported and acted upon; and finally, the strategy should be re-evaluated and realigned annually if need be. Each of these five focus areas will be briefly described in the following sub sections.

3.5.1 Strategic Alignment

"Strategic alignment focuses on ensuring the linkage of business and IT plans; on defining, maintaining and validating the IT value proposition; and on aligning IT operations with enterprise operations." (ITGI, 2007:2). The key question is whether IT

27

processes is in harmony with strategic objectives of the organization (intent, current strategy and enterprise goals) and thus building the capabilities necessary to deliver business value. This state of harmony is referred to as "alignment". For long-term sustainable success to be realized within an organization, Williams (2005) highlights that it is essential for employees within all business units to fully understand the organizational objectives and work in harmony to ensure that they are met. He further illustrates that strategic alignment ensures that maximum results are achieved by all business units working together to achieve the same goals. However, if some or one of the units perform poorly or do not aim to achieve the same organizational objectives, if leadership is weak, or if risks are not correctly managed, the outcome will be below what is anticipated, and instead of realizing value, it will be destroyed (Williams, 2005).

Alignment of IT has been synonymous with IT strategy, i.e., does the IT strategy support the enterprise strategy? For IT governance, alignment encompasses more than strategic integration between the (future) IT organization and the (future) enterprise organization. It is also about whether IT operations are aligned with the current enterprise operations. Of course, it is difficult to achieve IT alignment when enterprise units are misaligned (Grembergen V. , 2004).

3.5.2 Value Delivery

"Value delivery is about executing the value proposition throughout the delivery cycle, ensuring that IT delivers the promised benefits against the strategy, concentrating on optimizing costs and proving the intrinsic value of IT." (ITGI, 2007:2). The basic principles of IT value are delivery on time, within budget and with the benefits that were promised. In business terms, this is often translated into: competitive advantage, elapsed time for order/service fulfillment, customer satisfaction, customer wait time, employee productivity and profitability. Grembergen (2004) mentioned that several of these elements are either subjective or difficult to measure, something all stakeholders need to be aware of. The value that IT adds to the business is a function of the degree to which the IT organization is aligned with the business and meets the expectations of the business.

Grembergen (2004) illustrates the expectations relative to the contents of the IT deliverable that the business has;
   a. Fit for purpose, meeting business requirements
   b. Flexibility to adopt future requirements
   c. Throughput and response times
   d. Ease of use, resiliency and security
   e. Integrity, accuracy and currency of information

He also mentioned that the business also has expectations regarding the method of working:
   a. Time-to-market
   b. Cost and time management
   c. Partnering success
   d. Skill set of IT staff

28

To manage these expectations, IT and the business should use a common language for value which translates business and IT terminology and is based wholly on fact (Grembergen V. , 2004).

3.5.3 Resource Management

"Resource management is about the optimal investment in, and the proper management of, critical IT resources: processes, people, applications, infrastructure and information. Key issues relate to the optimization of knowledge and infrastructure." (ITGI, 2007:2). According to IT governance Institute (ITGI, 2003), effective IT performance is accomplished through good investment, use and allocation of IT resources used to service the needs of the organization. Appropriate handling of IT resources is important, as it ensures maximum efficiency of IT assets and their costs. In recent years, the biggest challenge for organizations was the issue of outsourcing (ITGI, 2003). This ranged from the choice of business activities to outsource, and which company to outsource the activities to, as well as managing the services to ensure that the agreed value is delivered at a reasonable price. Although service delivery is transferred, Simmonds and Gilmour (2005) illustrate that accountability still remains the responsibility of the client organization. They must ensure that risks are properly managed and that the service provider continuously delivers value. In addition, transparency and ownership of the decision-making process must remain the responsibility of the client organization.

3.5.4 Risk Management

"Risk Management requires risk awareness by senior corporate officers, a clear understanding of the enterprise's appetite for risk, transparency about the significant risks to the enterprise and embedding of risk management responsibilities into the organization." (ITGI, 2007:2). Enterprise risk comes in many varieties, not only financial risk, and IT is one of them. A cornerstone of IT governance is the management of risks. It is the process of ensuring that the strategic organizational objectives are not threatened by IT failures. Technological risk issues are increasingly dealt with by board members, as IT failure can have destructive consequences on an organization (Hardy, 2005). Therefore, Grembergen (2004) advised the board to manage their enterprise risk by:

    a. Ensuring that there is transparency about the significant risks to the organization and clarifying the risk-taking or risk-avoidance policies of the enterprise

    b. Being aware that the final responsibility for risk management rests with the board, so, when delegating to executive management, making sure the constraints of that delegation are communicated and clearly understood

    c. Being conscious that the system of internal control put in place to manage risks often has the capacity to generate cost-efficiency

    d. Considering that a transparent and proactive risk management approach can create competitive advantage that can be exploited

    e. Insisting that risk management is embedded in the operation of the enterprise, responds quickly to changing risks and reports immediately to appropriate levels of management, supported by agreed principles of escalation (what to report, when, where and how)

3.5.5 Performance Measurement

"Performance measurement tracks and monitors strategy implementation, project completion, resource usage, process performance and service delivery, using, for example, balanced scorecards that translate strategy into action to achieve goals measurable beyond conventional accounting." (ITGI, 2007:2). A number of methods, tools and best practices exist to assist with performance management responsibilities, such as return on investment (ROI) and balanced scorecards. Balanced Scorecards is a good tool to evaluate and translate strategy into action to achieve goals with a performance measurement system that goes beyond conventional accounting, measuring those relationships and knowledge-based assets necessary to compete in the information age: customer focus, process efficiency and the ability to learn and grow. At the heart of these scorecards is management information supplied by the IT infrastructure (Grembergen V. , 2004). IT also enables and sustains solutions for the actual goals set in the financial (enterprise resource management), customer (customer relationship management), process (intranet and workflow tools) and learning (Knowledge Management) dimensions of the scorecard. IT needs its own scorecard. Defining clear goals and good measures and clear reflect the business impact of the IT goals is a challenge and needs to be resolved in co-operation among the different governance layers within the enterprise (Grembergen V. , 2004).

3.6 IT governance Frameworks and standards

While there is no single, complete, off-the-shelf IT governance framework, there are a number of frameworks available that can serve for developing a governance model. As a result, most IT organizations today are "rolling their own" models, but borrowing heavily from existing frameworks. Most of the existing frameworks are complementary, with strengths in different areas, and so, a mix-and-match approach is often taken. Three of those frameworks are discussed in more detail below:

3.6.1 COBIT - The Control Objectives for Information and related Technology standard

COBIT is short for the Control Objectives for Information and Related Technology and was developed by Information Systems Audit and Control Association, ISACA in 1996. ISACA currently serves more than 110,000 constituents (members and professionals holding ISACA certifications) in more than 180 countries. The job titles of members are such as IS auditor, consultant, educator, IS security professional, regulator, chief information officer and internal auditor. They work in nearly all industry categories. There is a network of ISACA chapters with more than 200 chapters established in over 180 countries. Chapters provide education, resource sharing, advocacy, networking and other benefits (Wikipedia, 2013)

In April of 2012, ISACA released a version 5.0 of COBIT which constitutes the framework of reference in this thesis. COBIT 5 has been extended to serve as an IT governance framework by providing maturity models, critical success factors, key goal indicators, and key performance indicators for the management of IT. At the heart of COBIT are 37 high-level control objectives or processes. Corresponding to the 37 high-

level processes are 210 detailed control objectives or processes. These high-level processes has grouped in five domains: Evaluate, direct and monitor (EMD), Align, plan and organize (APO), Build, acquire and implement (BAI), Deliver, service and support (DSS), Monitor, evaluate and assesses (MEA).

The COBIT 5 product set includes a process capability model, based on the internationally recognized ISO/IEC 15504 Software Engineering—Process Assessment standard. This model achieves the same overall objectives of process assessment and process improvement support. This approach provides valuable information about the state of processes (ISACA, 2012).

Overall, COBIT represents a comprehensive framework for implementing IT governance with a very strong auditing and controls perspective, which has increasing resonance in the era of SarbanesOxley and other compliance-related regulations and legislation. Furthermore, it is the most complete guidance of best practices for IT governance framework (Hierrera & Kerta, 2012).

3.6.2 ITIL - The Information Technology Infrastructure Library (ITIL)

ITIL initially developed in the UK by the Office of Government Commerce (OGC), is gaining traction in the global IT community as a framework for IT governance. In its current form (known as ITIL 2011 edition), ITIL is published in a series of five core publications, each of which covers an IT Service Management lifecycle stage. ITIL is very much aimed at identifying best practices with regards to managing IT service levels, implementation of a central help desk function, defining of service processes within the IT organization, focus on the customer of the IT and defining and improving the quality of services of organizations .

The ITIL 2011 edition consists of five core publications: Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. There are twenty-six processes listed in ITIL 2011 edition that shows which core publication provides the main content for each process.

While COBIT takes the perspective of audit and control, ITIL takes the perspective of service management. The two frameworks are more complementary than competitive and components of both can be taken to build a governance framework.

3.6.3 ISO 17799 - The International Organization for Standardization's

The International Organization for Standardization has developed the third major governance framework, ISO 17799, titled "Information Technology — Code of Practice for Information Security Management." It was first released by the ISO in December 2000. However, it is based on British Standard 7799, which was finalized in 1999. The intent of the standard is to focus on security and aid an organization in the creation of an effective IT security plan.

The standard has the following high-level groupings: security policy, organizational security, asset classification and control, personnel security, physical and

environmental security, communications and operations management, access control, systems development and maintenance, business continuity management, and compliance. The standard is very thorough and covers a great deal of material in a concise manner.

ISO 17799 usually implemented subject to many of the following business (ITGI, 2007):

    a. Defining responsibility and organizational structures for information security;
    b. Identifying critical assets via the business risk assessment;
    c. Enhancing the knowledge and importance of security related issues at the management level; and
    d. Defining an information security management system and applying best practice in security management based on a systematic approach.

ISO 17799's relatively narrow focus on security makes it unsuitable as the sole basis for an IT governance framework, but since risk management is a component of IT governance, there is relevance to ISO 17799, and parts of it can be adopted in building an overall IT governance framework.

Ultimately, there are main standards that are generally acceptable to implement IT governance, which are; COBIT, ITIL and ISO 17799. Symons (2005) advised that important when developing IT governance to begin from your status and don't start from scratch. Furthermore, it is good to review the existing frameworks including COBIT, ITIL, and ISO 17799 to decide what the organization's need from the framework. Organization may borrow pieces from each of these when developing your own IT governance framework. If the organization is concerned about risk management and compliance posture, lean heavily on COBIT. If service delivery is challenging, ITIL is best framework. If security and is an issue ISO 17799 will be good.

3.7 IT Governance in Palestinian Government Sector

3.7.1 Overview

Since recent years, Palestinian government in Gaza exerting many efforts in integrating the information technology with their processes, and supporting theses efforts to increase IT's reliability and creditability as a key role that provides the success of government strategic plans and missions. Palestinian government believes that these evolution of the information technology increases the indicator of the development of nations and civilizations. Palestinian government is making continuously efforts to improve and organize IT sector, that contribute for promotion to achieve information society based on knowledge sharing rights, and to support a comprehensive and sustainable development (Aray, 2012).

The MTIT has the responsibility of organizing roles and senior supervisor for all IT sectors at the national level. The vision of MTIT is to build an efficient the telecommunications and IT sectors that contributes in development of the Palestinian society within all segments. By continues working to provide a regulatory environment that encourages fair competition and more productivity.

This section highlights Palestinian government efforts to improve IT as a key role of success to achieve the government strategic goals and missions and the relation with IT governance.

3.7.2 Strategic Plans

Due past years, the Palestinian government moves steady steps in the developing and implementing strategic plans in the areas of information technology. In this context, many committees formulated from government and non-government specialists and interests to identify and analyze the Palestinian environments and needs, and several workshops were held to analyze the reality and identify how to take advantage of opportunities to achieve best results. These committees resulted two important strategic plans, which are: the Palestinian e-Government Strategic Plan 2013-2015 and the Palestinian ICT Strategy 2013-1015.

a. Palestinian e-Government Strategic Plan 2013-2015:

The plan document (MTIT, 2014) identified the following values and determinations

- o The citizen is the centric of plan attention (Citizen is First).
- o Protect the privacy is guaranteed.
- o Optimum utilization of available resources.
- o To encourage the private sector to the advancement in information technology.
- o The society has all rights to monitor and evaluate the government activities performance.

Also, e-government plan strives to achieve many goal and objectives. First goal concentrated on implementing governance concepts that support e-government. Furthermore, the plan mentioned to upgrading the infrastructure for information technology, improve the efficiency of the administrative and financial environment through re-engineering processes, procedures simplification, fair allocation of IT budgets, encourage creativity and developing e-services and systems. Another goals mentioned to developing IT related policies and regulations. All these goals to achieve society segments satisfaction.

b. Palestinian ICT Strategy 2013-2015

The Palestinian ICT Strategy emphasized that the all efforts should be directed towards the citizen (Citizen-Centric), and should lead the country to sustainable development in the effectiveness of communication and information technology, a goal that the government has committed to achieve (MTIT, 2014).

The plan included a number of goals related to ICT sector that suitable and more realistic with the Palestinian situation, as follows:

- o A modern and sophisticated Structure of ICT that cover all Palestinian governorates with high quality.
- o Effective ICT sector which contributes to the development of the Palestinian economy.
- o Regulated ICT sector in accordance with clear policies and regulations.

- o Educational and research environment is able to respond to the requirements ICT improvements.
- o Cultured society is able to use technology safely so as to protect Palestinian social fabric.

7.3.3 Legislations and policies

Palestinian government has recent experience in the field of IT related legislations and policies. Due two past years, the government has adopted various regulations and laws that organize IT, includes:

a. Electronic Transactions Act.
b. Government data sharing and exchange policy.
c. Government Information Security Policy.
d. Software development Policy.
e. Publishing government websites and e- services Policy.
f. Palestinian Strategic Plan for ICT incubators.

Under supervision of MTIT, Expert teams and committees still working to review and formulate detailed regulations and guidelines and developing control and evaluation methodologies of those policies and Acts.

3.7.4 IT Infrastructure and Services

In the governments, the most important issues are to deliver the services to citizens with more quality with cost-effective. Reducing costs and sustainability are another issues that the government care on. Therefore, the Palestinian government have many projects in the fields of e-services that serves alike the governments institutes and citizens and effected directly and positively to the government and citizen satisfaction. Here is some of these services.

a. Centralized Government Database (GovDB)

GovDB was built in 2008, aimed to combine all governmental data in on central database that replicated and updated at time with source databases. It is reduced the cost in both of time and money and satisfy passed many troubles of connection, systems failures, and services unsustainability, security issues of the ministries databases. These features provides more dependency on the GovDB and support more e-transformation of services that published on Internet. Annual report of MTIT mentioned that more than 18 ministries depends on GovDB in their services. Furthermore, the report mentioned that there were more than 250 million queries on DB only in 2013, while 178,292 queries in 2008 (MTIT, 2014:2).

b. Government Single Sign On (SSO)

This service created in Aug, 2013. It is an e-service that enable all citizens to login to online services provided by all government e-services through only one account. About 150,000 registered citizens due the end of December, 2013 (MTIT, 2014:2).

c. Mobile Services and Applications

34

Smart devices now is cover the most of the works that was done by laptops, in addition to being a wireless communication mobiles. That helped in the spread of these devices dramatically, and become accessible to many different people. A study published in Palestinian Business Forum shows that there are high rate of Palestinian demand for smart phones in 2013, specifically during the fourth quarter increased to 95.7% of total mobile shipments in the market (PBF, 2014). At the end of 2013, MTIT published many of mobile services and applications that serves government and citizens on both. And focused to this purpose as a planned objective in 2014 executive plan (MTIT, 2014:2).

d. Government E-Services and Systems

All government institute competes each other to in developing their e-services to serve their consumer. Furthermore, there are many government systems or services called "Standard Government Systems/e-Services" and e-services are developed on time on central center and has central database and website to serve all government institutes. These standard systems support the reference ministry to monitor, control on other ministries. To illustrate the idea, Employee Affairs System is standard system serves all government employees and employees affairs in all ministries. In addition, the Employees Affairs Council (DIWAN) can monitor, control and direct employee affairs in these other through this system.

e. Network Infrastructure

At the end of 2013, there are 192 government node were connected in one government network, that provided by Palestinian Company for Telecommunications (PalTel). The government paid about $ 196,000 for PalTel Company for this network services. MTIT proposed a project study for building new private government network, the proposed budget of first stage is not exceed $433,330. This is reducing the cost, more control, more efficiency and speed of network lines, finally, the proposed network supports more security and privacy for government situations (MTIT, 2014).

3.7.5 Higher Management Support

To ensure the government is going in write way to achieve its objectives and strategic goals, government cabinet council formulated many committees of top-level management, IT managers, and consultants to maximize utilization of information technology in directing and implementing strategic goals and missions. Some committees is listed as follows:

a. Government e-Archiving Committee
b. Government Data Integration Committee (Takamul)
c. Higher Steering Committee for e-Government

3.7.6 Importance of IT governance for Palestinian Government Sector

As mentioned above, it is clear that Palestinian government sector has rapid development and high technological revolution and reliance on IT to achieve goals.

ICT Strategic plans of Palestinian government shows a high level of confidence in the constant fact that is the increasing of dependency on IT will reduce costs as risks,

improve services delivery, maximize utilization of assets and resources, make a fairness and transparency of management and financial practices mainly that IT-related. Therefore, this complexity of IT's dependency needs to be more standardized to make the governing of IT easier, more structured. The government has aware about governing of IT. The first goal that formulated in Palestinian e-Government Strategic Plan 2013-2015 was focused on IT governance, which is; "Implementing governance concepts that support e-government".

Next chapter illustrates more detail COBIT 5 framework, which has chosen as an IT governance framework that conducted in this research study.

Chapter Four:
Control Objectives Related Information Technology – COBIT 5

4.1 Introduction

4.1.2 History of COBIT framework

The Control Objectives for Information and related Technology (COBIT) is a set of best practices for information technology (IT) management created by ISACA and the IT Governance Institute (ITGI) in 1996.

ISACA develops and maintains the internationally recognized COBIT framework, helping IT professionals and enterprise leaders fulfill their IT governance responsibilities while delivering value to the business. And help organizations to ensure that IT is working as effectively as possible to minimize risk and maximize the benefits of technology investments.

COBIT framework provides managers, auditors, and IT users with a set of generally accepted measures, indicators, processes and best practices to assist them in maximizing the benefits derived through the use of information technology and developing appropriate IT governance and control in an organization.

The COBIT framework is used by many enterprises, government agencies, academic institutions and other entities around the world. Its framework helps to develop and document the appropriate organizational structures, processes and tools for effective management of IT in a comprehensive, integrated manner.

The first edition of COBIT was published in 1996. The second edition, in 1998, added Management Guidelines. The third edition was released in 2000; and the fourth edition was released in December 2005, being revised and receiving the 4.1 edition in May 2007.

Released in April 2012, COBIT 5 is ISACA's new framework. COBIT 5 consolidates and integrates the COBIT 4.1, Val IT 2.0 and Risk IT frameworks, and draws from ISACA's IT Assurance Framework (ITAF) and the Business Model for Information Security (BMIS). It aligns with frameworks and standards such as Information Technology Infrastructure Library (ITIL), International Organization for Standardization (ISO), Project Management Body of Knowledge (PMBOK), PRINCE2 and The Open Group Architecture Framework (TOGAF) (ISACA, 2012:2).

4.1.2 ISACA Foundation

ISACA got its start in 1967, when a group of individuals working on auditing controls in computer systems started to become increasingly critical of the operations of their organizations. They identified a need for a centralized source of information and guidance in the field. In 1969, the group formalized, incorporating as the EDP Auditors Association. In 1976 the association formed an education foundation to undertake large-scale research efforts to expand the knowledge and value of the IT governance and control field. The association became the Information Systems Audit and Control Association in 1994.By 2008 the

38

organization had dropped its long title and branded itself as ISACA.ISACA now goes by its acronym only, to reflect the broad range of IT governance professionals it serves.

Today, ISACA's constituency—more than 115,000 strong worldwide—is characterized by its diversity. Constituents live and work in more than 180 countries and cover a variety of professional IT and related positions. There is a network of ISACA chapters with more than 200 chapters established in over 180 countries. Chapters provide education, resource sharing, advocacy, networking and other benefits.

ISACA has become a pace-setting global organization for information governance, control, security and audit professionals. It has many international standards and publications, as COBIT, VAL IT, and Risk IT. ISACA publishes a leading technical journal in the information control field.

ISACA provides a professional certifications within the fields of information security, IT risk and IT governance. Its Certified Information Systems Auditor (CISA) certification is recognized globally and has been earned by more than 109,000 professionals since inception. The Certified Information Security Manager (CISM) certification uniquely targets the information security management audience and has been earned by more than 25,000 professionals. The Certified in the Governance of Enterprise IT (CGEIT) designation promotes the advancement of professionals who wish to be recognized for their IT governance-related experience and knowledge and has been earned by more than 6,000 professionals. The Certified in Risk and Information Systems Control (CRISC) designation for those who identify and manage risks through the development, implementation and maintenance of information systems controls has been earned by more than 17,000 professionals. (ISACA, 2014)

4.2 Overview of COBIT 5

COBIT 5 is the latest edition of ISACA's globally accepted framework, providing an end-to-end business view of the governance of enterprise IT that provides a comprehensive framework that assists enterprises in achieving their objectives for the governance and management of enterprise IT, starting from stakeholder needs with regard to information and technology. Simply stated, it helps enterprises create optimal value from IT by maintaining a balance between realizing benefits and optimizing risk levels and resource use. The framework enables IT to be governed and managed in a holistic manner for the entire enterprise, taking in the full end-to-end business and IT functional areas of responsibility, considering the IT-related interests of internal and external stakeholders. COBIT 5 is generic and useful for enterprises of all sizes, whether commercial, not-for-profit or in the public sector (ISACA, 2012).

COBIT 5 is comprehensive integration framework with other major frameworks, standards and resources, including ISACA's Val IT and Risk IT, Information Technology

39

Infrastructure Library (ITIL) and related standards from the International Organization for Standardization (ISO) (ISACA, 2012:2).

ISACA (2012:2) listed six Benefits that COBIT 5 may help enterprises of all sizes, which are:
   a. Maintain high-quality information to support business decisions
   b. Achieve strategic goals and realize business benefits through the effective and innovative use of IT
   c. Achieve operational excellence through reliable, efficient application of technology
   d. Maintain IT-related risk at an acceptable level
   e. Optimize the cost of IT services and technology
   f. Support compliance with relevant laws, regulations, contractual agreements and policies

COBIT 5 includes comprehensive set of products for governance and management of enterprise IT that developed by ISACA. This product family includes the framework itself, and others providing additional guidance on the enablers within the framework and how professionals can use COBIT in delivering their products and services. The COBIT 5 product family includes the following products:
   a. COBIT 5 (the framework)
   b. COBIT 5 enabler guides, in which governance and management enablers are discussed in detail. These include:
        o COBIT 5: Enabling Processes
        o COBIT 5: Enabling Information
        o Other enablers guides
   c. COBIT 5 professional guides, which include:
        o COBIT 5 Implementation
        o COBIT 5 for Information Security
        o COBIT 5 for Assurance
        o COBIT 5 for Risk
        o Other professional guides
   d. A collaborative online environment, which will be available to support the use of COBIT 5 (ISACA, 2012:2).

4.3 COBIT 5 Principles and Enablers
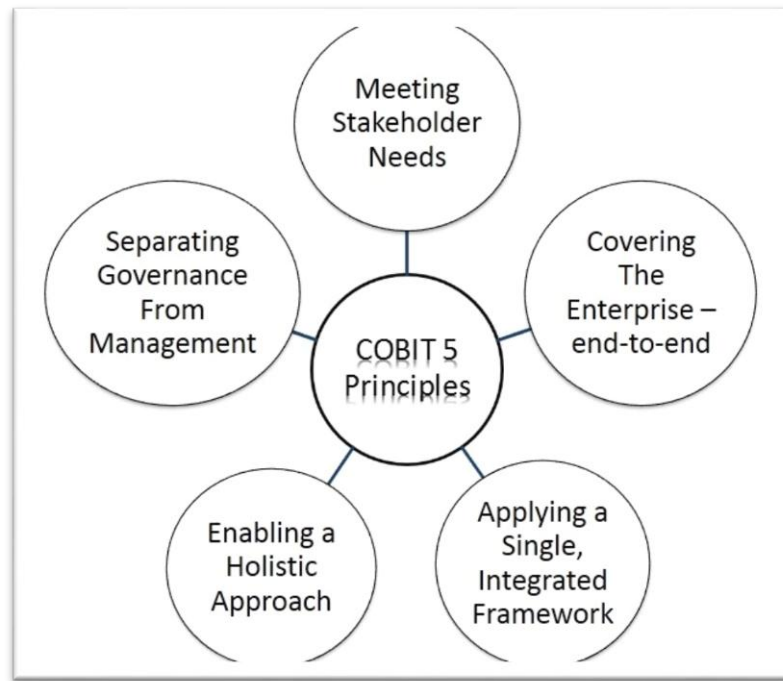
Figure (4.1): COBIT 5 Principles
Source: Designed By Researcher

Figure (4.1) shows that COBIT 5 is based on five key principles, for governance and management of enterprise IT:

a. Principle 1: Meeting Stakeholder Needs

Enterprises exist to create value for their stakeholders by maintaining a balance between the realization of benefits and the optimization of risk and use of resources. COBIT 5 provides all of the required processes and other enablers to support business value creation through the use of IT. Because every enterprise has different objectives, an enterprise can customize COBIT 5 to suit its own context through the goals cascade, translating high-level enterprise goals into manageable, specific, IT-related goals and mapping these to specific processes and practices.

b. Principle 2: Covering The Enterprise –end-to-end

COBIT 5 integrates governance of enterprise IT into enterprise governance:

o   It covers all functions and processes within the enterprise; COBIT 5 does not focus only on the 'IT function', but treats information and related technologies as assets that need to be dealt with just like any other asset by everyone in the enterprise.

o   It considers all IT-related governance and management enablers to be enterprise wide and end-to-end, i.e., inclusive of everything and everyone—

41

internal and external—that is relevant to governance and management of enterprise information and related IT.

c. Principle 3: Applying a Single, Integrated Framework

There are many IT-related standards and best practices, each providing guidance on a subset of IT activities. COBIT 5 aligns with other relevant standards and frameworks at a high level, and thus can serve as the overarching framework for governance and management of enterprise IT.

d. Principle 4: Enabling a Holistic Approach

Efficient and effective governance and management of enterprise IT require a holistic approach, taking into account several interacting components. COBIT 5 defines a set of enablers to support the implementation of a comprehensive governance and management system for enterprise IT. Enablers are broadly defined as anything that can help to achieve the objectives of the enterprise. The COBIT 5 framework defines seven categories of enablers are listed in Figure (4.2).
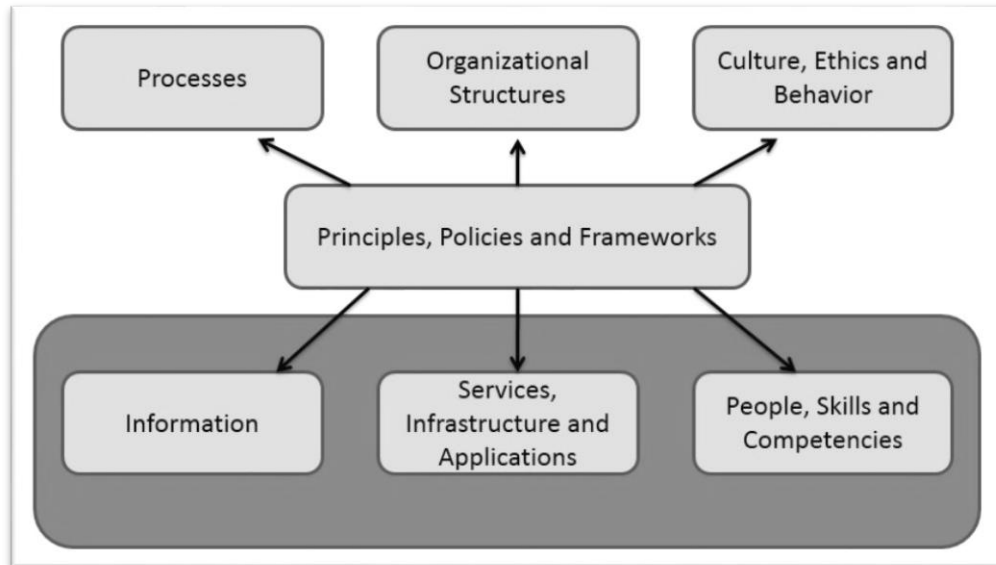
Figure (4.2): IT governance Enablers
Source: Designed By Researcher

COBIT 5 Enablers

- o Principles, Policies and Frameworks; which are the vehicle to translate the desired behavior into practical guidance for day-to-day management.
- o Processes; which describe an organized set of practices and activities to achieve certain objectives and produce a set of outputs in support of achieving overall IT-related goals.
- o Organizational Structures; which are the key decision-making entities in an enterprise.

42

- o Culture, Ethics and Behavior; of individuals and of the enterprise are very often underestimated as a success factor in governance and management activities.
- o Information; which is pervasive throughout any organization and includes all information produced and used by the enterprise. Information is required for keeping the organization running and well governed, but at the operational level, information is very often the key product of the enterprise itself.
- o Services, Infrastructure and Applications; which include the infrastructure, technology and applications that provide the enterprise with information technology processing and services.
- o People, Skills and Competencies; which are linked to people and are required for successful completion of all activities and for making correct decisions and taking corrective actions.

e. Principle 5:

The COBIT 5 framework makes a clear distinction between governance and management. These two disciplines encompass different types of activities, require different organizational structures and serve different purposes. COBIT 5's view on this key distinction between governance and management is:
- o Governance ensures that stakeholder needs, conditions and options are evaluated to determine balanced, agreed-on enterprise objectives to be achieved; setting direction through prioritization and decision making; and monitoring performance and compliance against agreed-on direction and objectives. In most enterprises, overall governance is the responsibility of the board of directors under the leadership of the chair person.
- o Management ensures plans, builds, runs and monitors activities in alignment with the direction set by the governance body to achieve the enterprise objectives. In most enterprises, management is the responsibility of the executive management under the leadership of the chief executive officer (CEO).

Together, these five principles enable the enterprise to build an effective governance and management framework that optimizes information and technology investment and use for the benefit of stakeholders.

4.4 The COBIT 5 Domains and Processes

The COBIT 5 has 37 high-level processes, over 300 detailed control objectives to provide comprehensive governance and management of enterprise IT. The COBIT 5 process reference model subdivides the governance and management processes of enterprise IT into two main areas of activity—governance and management—divided into domains of processes; as shown in Figure (4.3).
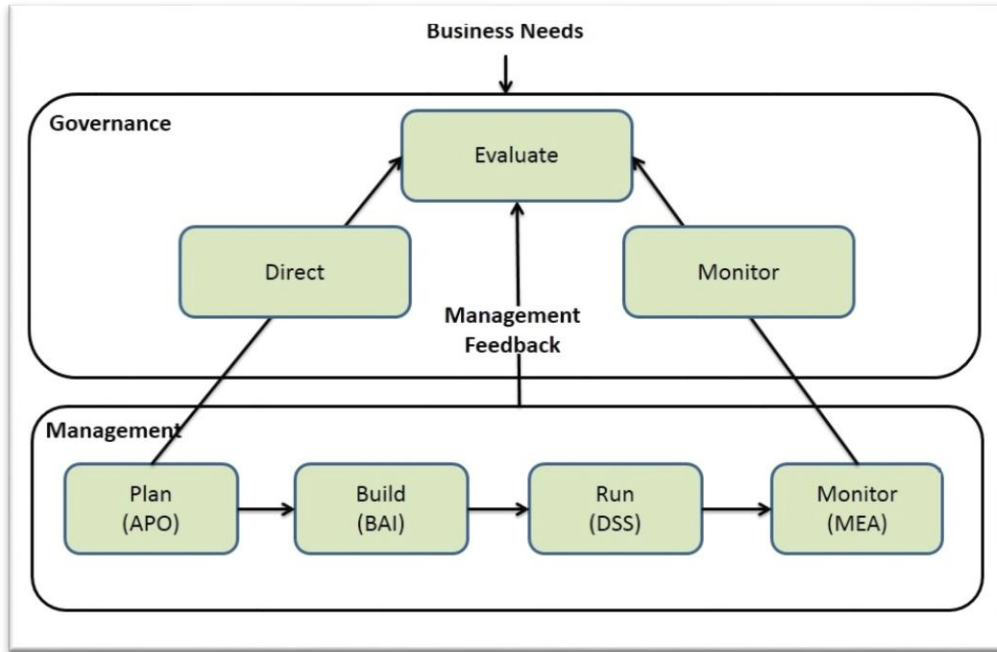
Figure (4.3): COBIT 5 Governance & Management Key Areas
Source: (ISACA, 2012)

   c. Governance:

Table (4.1): High Level Control objectives/Processes of EDM domain

Domain	High Level Control objectives/Processes
Evaluate, Direct and Monitor (EDM)	EDM01 Ensure Governance Framework Setting and Maintenance
	EDM02 Ensure Benefits Delivery
	EDM03 Ensure Risk Optimization
	EDM04 Ensure Resource Optimization
	EDM05 Ensure Stakeholder Transparency

This domain contains five processes that ensures that enterprise objectives are achieved by evaluating stakeholder needs, conditions and options; setting direction through prioritisation and decision making; and monitoring performance, compliance and progress against agreed-on direction and objectives. These practices are defined in the domain named as "Evaluate, Direct and Monitor" (EDM). Table (4.1) listed the high control processes of EDM domain:

   d. Management:
      which includes four domains are in line with the responsibility areas of plans, builds, runs and monitors activities in alignment with the direction set by the governance body to

achieve the enterprise objectives (PBRM), and they provide end-to-end coverage of IT. The management of enterprise IT covers the 4 following domains:

Table (4.2): High Level Control objectives/Processes of APO domain

Domain	High Level Control objectives/Processes
Align, Plan and Organize (APO)	APO01 Manage the IT Management Framework
	APO02 Manage Strategy
	APO03 Manage Enterprise Architecture
	APO04 Manage Innovation
	APO05 Manage Portfolio
	APO06 Manage Budget and Costs
	APO07 Manage Human Resources
	APO08 Manage Relationships
	APO09 Manage Service Agreements
	APO10 Manage Suppliers
	APO11 Manage Quality
	APO12 Manage Risk
	APO13 Manage Security

o   Align, plan and organize (APO)

This domain includes 13 main processes which listed in Table (4.2) that covers the use of information & technology and how best it can be used in the organization to help achieve the organization's goals and objectives. It also highlights the organizational and infrastructural form IT is to take in order to achieve the optimal results and to generate the most benefits from the use of IT.

Table (4.3): High Level Control objectives/Processes of BAI domain

Domain	High Level Control objectives/Processes
Build, Acquire and Implement (BAI)	BAI01 Manage Programs and Projects
	BAI02 Manage Requirements Definition
	BAI03 Manage Solutions Identification and Build
	BAI04 Manage Availability and Capacity
	BAI05 Manage Organizational Change Enablement
	BAI06 Manage Changes
	BAI07 Manage Changes Acceptance and Transitioning
	BAI08 Manage Knowledge
	BAI09 Manage Assets
	BAI10 Manage Configuration

o Build, acquire and implement (BAI)

This domain includes 10 main processes which listed in Table (4.3) that cover identifying IT requirements, acquiring the technology, and implementing it within the company's current business processes.

Table (4.4): High Level Control objectives/Processes of DSS domain

Domain	High Level Control objectives/Processes
Deliver, Service and Support (DSS)	DSS01 Manage Operations
	DSS02 Manage Service Requests and Incidents
	DSS03 Manage Problems
	DSS04 Manage Continuity
	DSS05 Manage Security Services
	DSS06 Manage Business Process Controls

o Deliver, service and support (DSS)

Table (4.4) shows all 6 main processes of the domain which are focuses on the delivery aspects of the information technology. It covers areas such as the execution of the applications within the IT system and its results, as well as, the support processes that enable the effective and efficient execution of these IT systems.

Table (4.5): High Level Control objectives/Processes of MEA domain

Domain	High Level Control objectives/Processes
Monitor, Evaluate and Assess (MEA)	MEA01 Monitor, Evaluate and Assess Performance and Conformance
	MEA02 Monitor, Evaluate and Asses the System of Internal Control
	MEA03 Evaluate and Assess Compliance with External Requirements

o Monitor, evaluate and assesses (MEA)

This domain includes 3 main processes which are listed in Table (4.5). These processes deals with an organization's strategy in assessing the needs of the organization and whether or not the current IT system still meets the objectives for which it was designed and the controls necessary to comply with regulatory requirements. Monitoring also covers the issue of an independent assessment of the effectiveness of IT system in its ability to meet business objectives and the organization's control processes by internal and external auditors.

Refer to Appendix D for more detail about COBIT 5 processes

4.5 IT Governance Framework Starting Point

As discussed in pervious section, COBIT 5 framework provides a complete and comprehensive reference model of all that represents all of the processes normally found in an enterprise relating to IT activities. ISACA (2012:3) advice each enterprise to define its own process set, taking into account the specific situation.

47

Chapter Five:
Research Methodology

5.1 Research Design

Analytical descriptive techniques were used to conduct this study and sustain quantitative and qualitative measurement and analysis. The questionnaire was used to collect the information to achieve the purpose of the study.

5.2 Data Collection

Different tools were utilized to collect the data as the follows to ensure the study creditability:

a. Secondary Data

To introduce the theoretical literature of the subject, author was used numerous sources. The following sources were used in this study:
   o books, published papers, periodicals, articles and journals;
   o IT governance standards, frameworks;
   o Websites and electronic versions.

b. Primary Data

In order to collect and analyze qualitative and quantitative data, the questionnaire was used as the primary tool for collecting primary data.

Questioners are used to gather information from individuals using a formally designed list of questions. The survey questionnaire was developed based on the COBIT 5 framework. The wording used in the questionnaire for each of the COBIT high-level processes was taken directly from the framework. The questionnaire was written in Arabic and English language. The components of the survey questionnaire were as follows:

- First Part: considers general data about participants such as age, qualifications, position level and ICT level in the organization.
- Second Part: of the questionnaire asked participants to rate the 37 high-level processes from the COBIT 5 framework according to their priority to public sector on Likert-type scale.

The questionnaire used 10 point Likert –type. This Likert -type scale has derived from related previous studies to elicit the perceived priorities of the processes .These ratings then analyzed to produce a ranked priority list, easier to compare with that produced in these previous studies, in order to determine the processes that will be considered most relevant to Palestinian government sector. A key indicating the exact rating for each box was located at the top of each page. A copy of the questionnaire is located in Appendix A.

5.3 Research Population

The population in this study consists of IT managers at Palestinian government institutes to examine priorities of IT governance processes. The number of occupied IT divisions at Palestinian government sectors in December 2013 (when the sample chosen) were 28 active ministries or institutes and 57 IT managers (DIWAN, Personal Communication, Jan 5, 2014). The whole population was chosen as the respondent in this study and the research included all those managers in collecting the needed data. There were four managers that did not respond to the questionnaire, and there two responses were neglected because the respondents were not serious in answering questions. On the other hand, questionnaires were distributed and collected by hand.

Related to Baruch (1999), a good response rate for top managers or representatives of organizations is usually about (36%), and for lower-level managers about (60%). In this study, there were 51 valid responses, with response rate of (89.5 %). By given confidence level (95%) and (5%) of error margin. response rate (89.5%) is high response rate. This may attributable to the method of distribution the questionnaires, document surveys were distributed by the researcher. Furthermore, the study was seen by participants as credible and relevant.

5.4 Research Procedures

5.4.1 Research Duration

The study was conducted from November 2013 to April 2014. The questionnaires were distributed and collected with February 2014.

5.4.2 Research Location

The study was applied to Palestinian government sector located in Gaza strip, Palestine.

5.5 Data Analysis

Both qualitative and quantitative data were analyzed.

Direct contact visiting was used to distribute and collect the questionnaires, and then the input has been analyzed using Statistical Package for Social Sciences (SPSS 18). The following scale was used to enter and analyze the received data:

Rate Value	10-9	8-7	6-5	4-3	2-1
priority	Highest	High	Normal	Low	Lowest

50

5.6 Statistical analysis Tools

The study utilized the following statistical tools:

- One-Sample Kolmogorov-Smirnov Test to examine normality of data.
- Cronbach's Alpha for reliability statistics.
- Spearman Rank and Pearson correlation factor to test validity.
- Frequency, percentage and descriptive analysis to represent the collected data in a meaningful numbers and descriptions.
- Nonparametric Sign Test.
- Parametric T-Test.
- One-way ANOVA Test.
- Kruskal-Wallis Test.

5.7 Normality of Data

In social studies usually conducting Kolomogrov-Simrnov Test is necessary to examine whether the data is parametric or non-parametric.

Table (5.1): Kolmogorov-Smirnov test value

No.	Domain	Kolmogorov-Smirnov test value	P-Value (Sig.)
1	APO	0.086	0.200
2	BAI	0.102	0.200
3	DSS	0.072	0.200
4	EDM	0.102	0.200
5	MEA	0.146	0.009
	All Five Domains	**0.098**	**0.200**

Based on Kolmogorov-Smirnov test, the distribution for the domains APO, BAI, DSS and EDM are normally distributed, since the P-value (sig.) is larger than the level of significance $\alpha=0.05$ .So data of these domains are parametric. While the distribution of MEA domain are not normally distributed and data are non-parametric, since the P-value (sig.) is smaller than the level of significance $\alpha=0.05$. As shown in Table (5.1).

5.8 Validity of the questionnaire

Validity is defined as the degree to which the researcher has measured what he has set out to measure (Smith, 1991). In terms of measurement procedures, therefore, validity is the ability of an instrument to measure what it is designed to measure. Several issues of validity had been addressed in this study.

51

To improve external validity, that is the degree to which the conclusion in the study can be generalized, the comprehensive survey of all population was chosen as the respondent.

Content validity is judged on the basis of the extent to which statements or questions represent the issues they are supposed to measure (Kumar, 2005). In this study, the questionnaire has been given to a group of referees to judge its validity according to its content, the clearness of its items meaning, appropriateness to avoid any misunderstanding and to assure its linkage with the study objectives.

Translation of Arabic questionnaire was then reviewed with the help of English / Arabic expert translator, to ensure no meaning was lost during the translation from English language to Arabic language. Furthermore, in the second section of the questionnaire, all 37 COBIT high-level processes were included, therefore covering the issue of content validity.

Statistical validity also is used to evaluate instrument validity. To insure the statistical validity of the questionnaire, structure validity test (Spearman test) that used to test the validity of the questionnaire structure by testing the validity of each item and the validity of the whole questionnaire. It measures the correlation coefficient between one item and all the items of the questionnaire that have the same level of similar scale.

5.8.1 Internal Validity of the Questionnaire

Internal structure validity measures the correlation coefficient between one item and all the items of the questionnaire that have the same level of liker scale.

The study assessed the items' structure validity by calculating the correlation coefficients of each item of the questionnaire and the whole of questionnaire.

Two internal validity were used, Spearman correlation coefficient test used to test internal validity of each item of the domain MEA and the whole of questionnaire, while Pearson correlation coefficient test used to test internal validity of each item of the domains APO, PAI, DSS, and EDM and the whole of questionnaire. As shown in Table (6.2) and Table (5.3)

Table (5.2): Correlation coefficient of each item of the Domain MEA and the whole of questionnaire

No.	Paragraph	Spearman Correlation Coefficient	P-Value (Sig.)
1	MEA01	0.73	0.000
2	MEA02	0.73	0.000
3	MEA03	0.68	0.000

www.manaraa.com

Table (5.3): Correlation coefficient of each item of domains (APO, PAI, DSS, EDM) and the whole of questionnaire

No.	Paragraph	Pearson Correlation Coefficient	P-Value (Sig.)
1	APO01	0.429	0.002
2	APO02	0.470	0.000
3	APO03	0.379	0.006
4	APO04	0.534	0.000
5	APO05	0.419	0.002
6	APO06	0.593	0.000
7	APO07	0.520	0.000
8	APO08	0.546	0.000
9	APO09	0.548	0.000
10	APO10	0.484	0.000
11	APO11	0.595	0.000
12	APO12	0.720	0.000
13	APO13	0.723	0.000
14	BAI01	0.733	0.000
15	BAI02	0.644	0.000
16	BAI03	0.759	0.000
17	BAI04	0.655	0.000
18	BAI05	0.81	0.000
19	BAI06	0.706	0.000
20	BAI07	0.738	0.000
21	BAI08	0.776	0.000
22	BAI09	0.756	0.000
23	BAI10	0.749	0.000
24	DSS01	0.749	0.000
25	DSS02	0.555	0.000
26	DSS03	0.771	0.000
27	DSS04	0.535	0.000
28	DSS05	0.828	0.000
29	DSS06	0.733	0.000
30	EDM01	0.708	0.000
31	EDM02	0.708	0.000
32	EDM03	0.686	0.000
33	EDM04	0.632	0.000
34	EDM05	0.754	0.000

53

Table (5.2) and Table (5.3) clarifies the correlation coefficient for each item and the whole questionnaire. The p-values (Sig.) are less than 0.05, so the correlation coefficients of all the items are significant at $\alpha = 0.05$, so it can be said that the items are valid to be measured what it was set for to achieve the main aim of the study.

5.9 Reliability of the questionnaire

Reliability is considered to be the ability of the instrument used in research to consistently measure the characteristic of interest. Therefore, a scale or test is reliable to the extent that repeat measurements made by it under constant conditions will give the same result (Moser & Kalton, 1989). To ensure reliability of the questionnaire, each item in the study questionnaire has derived from each process from the COBIT 5 framework. Furthermore, Cronbach's Coefficient Alpha method were used to measure internal consistency.

5.9.1 Cronbach's Coefficient Alpha

This method is used to measure the reliability of the questionnaire between each domian and the mean of the whole domains of the questionnaire. The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency. The Cronbach's coefficient alpha was calculated for each items' domain of the questionnaire.

Table (5.4): Cronbach's Alpha for each items' domain of the questionnaire and the entire questionnaire.

Domain	Number of items	Cronbach's Alpha	Reliability *
APO	13	0.838	0.915
BAI	10	0.928	0.963
DSS	6	0.852	0.923
EMD	5	0.855	0.925
MEA	3	0.843	0.918
Total	**37**	**0.962**	**0.980**

* Reliability = Square root of Cronbach's Alpha

Table (5.4) shows the values of Cronbach's Alpha for each domain of the questionnaire and the entire questionnaire. For the domains, values of Cronbach's Alpha were in the range from 0.838 and 0.928. Therefore, the reliability scores range from 0.915 and 0.963. This range is considered high; the result ensures the reliability of each field of the questionnaire. Cronbach's Alpha equals 0.960 for the entire questionnaire and the corresponding reliability score is 0.980 which indicates an excellent reliability of the entire questionnaire. This proved that the questionnaire was valid and reliable.

Chapter Six:
Results and Discussion

6.1 Introduction

This chapter examines and analyses the results of collected data. It is divided into three parts. First one describes the respondents' specifications (sample characteristics) in the term of their ages, qualifications, positions, experience and organizational levels of IT divisions.

In the second part, data analysis results were explained, analyzed and discussed and the IT governance processes were rated to measure which of them are considered the highest priority to the Palestinian government.

Third part, output data were compared with previous studies to find the similarities and differences

6.2 Sample Characteristics

6.2.1 Ages

Table (6.1): Sample Ages

Age	Frequently	Percentage
Less than 30	11	21.6%
Between 30 and (less than) 40	30	58.8%
between 40 and 50	10	19.6%
Total	51	100%

The results for the respondents' ages are presented in Table (6.1). Around twenty two (21.6 %) of respondents are younger than 30, There are (58.8 %) of respondents' ages are between 30 and 40, and (19.6 %) of the respondents' ages are more than or equal 40 years old.

This fact shows that about (81 %) of respondents' are less than 40 years old, this gives an indicator about their motivation to change. They may be considered as the key persons to success the IT governance implementation in the future.

6.2.2 Qualifications

Table (6.2): Sample Qualifications

Qualifications	Frequently	Percentage
Bachelor	34	66.7%
Master	16	31.3%
Doctoral	1	2.0%
Total	51	100%

Table (6.2) shows that there are around one-third of the sample (33.3 %) having a high education degree, divided between (31.3%) have master degree and (2%) have doctoral degree, while the most of respondents are having bachelor degree (66.7 %).

56

That means all that all respondents are educated and having at least bachelor degree.

6.2.3 Positions

Table (6.3): Sample Positions

Management Level	Position	Frequently	Percentage
Top-Level Management	Deputy	1	2.0%
	General Director	11	21.5%
	Vise of General Director	1	2.0%
Mid-Level Management	Head of Department	21	41.2%
Low-Level Management	Head of Section	17	33.3%
Total		51	100%

Table (6.3) represents respondents' positions. There are (33.3 %) of responders' are specified low-level managers. More than quarter of the sample (25.5 %) are top-level managers, while (41.2 %) of the sample are mid-level managers.

This indicates that there is a mixture of managerial positions between research respondents which reflects their level of effectiveness in their organizations.

6.2.4 Experience

Table (6.4): Experience

Years' Experience in the Position	Frequently	Percentage
One to Less than six years	38	74.5%
Six to ten years	8	15.7%
more than ten years	5	9.8%
total	51	100%

It is clear from Table (6.4) that most of the respondents (74.5 %) are having less than six years of experience, while (15.7 %) of respondents having experience between six and ten years, and there are about (10%) have more than ten years' experience. There is a good indicator which is more than (90 %) of respondents having less than 10 years' experience in their working field. These groups of managers have more acceptances to change; this helps to build a new governance culture in their organizations.

57

6.2.5 Organizational Level of IT Division

Table (6.5): Organizational Level of IT Division

Organizational Level of IT Division	Frequently	Percentage
General Directorate	37	72.6%
Unit	7	13.7%
Department	5	9.8%
Section	2	3.9%
Total	51	100%

The result showed in Table (6.5) about (72.6 %) of respondents IT divisions in their organizations are general directorates, about (13.7 %) are units, while around (10 %) are departments and less than (4 %) are sections.

It clear from the results that more than eighty five (86.3 %) of respondents' IT divisions are general directorates or units. This reflects the power of decision making of IT divisions in the government organizations.

6.2.6 Summery of Sample Characteristics

The demographic data derived from the first section of the questionnaire comprised respondents' ages, qualifications, positions, experience and type of IT division. This provides a context for the data obtained from the second section of the questionnaire, the rating of the high level processes of COBIT that will be discussed in the following section.

6.3 Data Statistical Analysis

The processes' dimensions of the questionnaire were analyzed and discussed using One Sample T-test for the processes of domains APO, BAI, DSS and EDM. Sign test were used to analyze the processes of the domain MEA.

These two types of test were examined to determine if the mean of each item process is significantly different from hypothesized value 6.5. If the P-value (Sig.) is smaller than or equal to the level of significance $\alpha=0.05$, then the mean is significantly different from a hypothesized value 6.5. The sign of the Test value indicates whether the mean is significantly greater or smaller than the hypothesized value 6.5. On the other hand, if the P-value (Sig.) is greater than the level of significance $\alpha=0.05$, then, the mean is insignificantly different from hypothesized value 6.5.

58

Table (6.6): The mean and test value for Domain processes:
"APO: Align, Plan and Organize"

No.	Process Name	Mean	Proportional Mean %	Test Value	P-Value (Sig)
1	APO01 Manage the IT Management Framework	7.08	70.78	2.099	0.041*
2	APO02 Manage Strategy	7.51	75.10	3.925	0.000*
3	APO03 Manage Enterprise Architecture	6.86	68.63	1.731	0.090
4	APO04 Manage Innovation	5.86	58.63	-2.398	0.020
5	APO05 Manage Portfolio	3.92	39.22	-8.445	0.000
6	APO06 Manage Budget and Costs	6.75	67.45	0.876	0.385
7	APO07 Manage Human Relations	4.84	48.43	-4.657	0.000
8	APO08 Manage Relationships	7.24	72.35	3.082	0.003*
9	APO09 Manage Service Agreements	6.55	65.49	0.218	0.828
10	APO10 Manage Suppliers	6.49	64.90	-0.047	0.963
11	APO11 Manage Quality	5.33	53.33	-4.237	0.000
12	APO12 Manage Risk	5.98	59.80	-1.749	0.086
13	APO13 Manage Security	7.22	72.16	3.187	0.002*

* The mean is significantly different from 6.5

The results related to the APO domain "Align, Plan and Organize", shown in Table (6.6) denote the following facts:

- In reference to item no. (1) "APO01 Manage the IT Management Framework", the weight mean response of this item is (70.78%) with mean value (7.08) which is more than hypothesized value (6.5) and P-Value equal (0.041) which is less than 0.05. This ensures that managing IT framework process supporting the enterprise governance and affecting IT governance for Palestinian government sectors.
- In reference to item no. (2) "APO02 Manage Strategy", most respondents (75.1%) considers that the strategic IT plans are in line with the general goals and objectives and confirms that this process is significantly effecting IT governance for Palestinian government sectors, since the mean of responses to this item is (7.51) with a significance level of (0.000) for the test, which is less than 0.05.
- In reference to item no. (3) "APO03 Manage Enterprise Architecture", the weight mean response of this item is (68.63%) and mean value is (6.86). since P-Value equal (0.09)

59

which is greater than 0.05. That means the clarity identification of the linkage between different organization building blocks is not significantly effecting on IT governance for Palestinian government sectors.

- In reference to item no. (4) "APO04 Manage Innovation", the weight mean response of this item is (58.63%), mean value is (5.86) which is less than hypothesized value (6.5) and P-Value equal (0.02) which is more than 0.05. That means managing innovation is not significantly effecting on IT governance for Palestinian government sectors.

- In reference to item no. (5) "APO05 Manage Portfolio", the weight mean response of this item is (39.22%), mean value is (3.92) which is less than hypothesized value (6.5) and P-Value equal (0) which is greater than 0.05. That means managing of portfolio of programs is not significantly effecting on IT governance for Palestinian government sectors.

- In reference to item no. (6) "APO06 Manage Budget and Costs", the weight mean response of this item is (67.45%), mean value is(6.75) which is less than hypothesized value (6.5) and P-Value equal (0.385) which is less than 0.05. That means managing IT-related financial activities considered is not significantly effecting on IT governance for Palestinian government sectors.

- In reference to item no. (7) "APO07 Manage Human Relations", less than half of respondents (48.43%) considers that there is no enough priority in improving of IT human resources and has no significant effect on IT governance for Palestinian government sectors. Since mean value is (4.84) which is less than hypothesized value (6.5) and P-Value equal (0) which is greater than 0.05.

- In reference to item no. (8) "APO08 Manage Relationships", around (72.35%) of respondents confirms that the contribution IT increases confidence, trust in building internal and external relationships and has the high priority and significance effect on IT governance for Palestinian government sectors. Since mean value is (7.24) which is more than hypothesized value (6.5) and P-Value equal (0.003) which is less than 0.05.

- In reference to item no. (9) "APO09 Manage Service Agreements", the weight mean response of this item is (65.49%), mean value is (6.55) and P-Value equal (0.828) which is less than 0.05. That means managing service agreements has no strong effect on IT governance for Palestinian government sectors.

- In reference to item no. (10) "APO10 Manage Suppliers", the weight mean response of this item is (64.9%), mean value is (6.49) and P-Value equal (0.963) which is less than 0.05. That means reviewing and monitoring IT-related suppliers' performance for effectiveness and compliance to meet requirements has no strong effect on IT governance for Palestinian government sectors.

- In reference to item no. (11) "APO11 Manage Quality", the weight mean response of this item is (53.33%), mean value is (5.33) which is less than hypothesized value (6.5). That

60

means quality management of all IT processes, procedures and related outcomes has no high priority and negative effect on IT governance for Palestinian government sectors.

- In reference to item no. (12) "APO12 Manage Risk", the weight mean response of this item is (59.8%), mean value is (5.98) which is less than hypothesized value (6.5) and P-Value equal (0.086) which is more than 0.05. That means managing IT-related risks not significantly effect on IT governance for Palestinian government sectors.
- In reference to item no. (13) "APO13 Manage Security", the weight mean response of this item is (72.16%), mean value is (7.22) which is more than hypothesized value (6.5) and P-Value equal (0.002) which is less than 0.05. That means the process of define, operate and monitor information security policies and procedures to protect sensitive data is high significant effect on IT governance for Palestinian government sectors.

Overall, that there are four processes of APO domain has mean values more than 6.5 and P-value less than 0.05, and their mean values laid between (64.9%) and (75.1%). That means about (30%) of APO domain processes affecting significantly in the priorities of IT governance implementation among the respondents, which are APO01, APO02, APO08 and APO13.

Table (6.7): The mean and test value for Domain processes: "BAI: Build, Acquire and Implement"

No.	Process Name	Mean	Proportional Mean %	Test Value	P-Value (Sig)
1	BAI01 Manage Programs and Projects	6.84	68.43	1.482	0.145
2	BAI02 Manage Requirements Definition	6.80	68.04	1.326	0.191
3	BAI03 Manage Solutions Identification and Build	7.55	75.49	4.948	0.000*
4	BAI04 Manage Availability and Capacity	6.78	67.84	1.247	0.218
5	BAI05 Manage Organizational Change Enablement	6.51	65.10	0.049	0.961
6	BAI06 Manage Changes	6.39	63.92	-0.463	0.645
7	BAI07 Manage Changes Acceptance and Transitioning	6.61	66.08	0.463	0.645
8	BAI08 Manage Knowledge	6.51	65.10	0.039	0.969
9	BAI09 Manage Assets	7.10	70.98	2.478	0.017*
10	BAI10 Manage Configuration	6.59	65.88	0.393	0.696

* The mean is significantly different from 6.5

The results related to the BAI domain "Build, Acquire and Implement", shown in Table (6.7) denote the following facts:

- In reference to item no. (1) "BAI01 Manage Programs and Projects", the weight mean response of this item is (68.43%), mean value is(6.84) which is more than hypothesized value (6.5) and P-Value equal (0.145) which is more than 0.05. That means the managing programs and projects has no strong significant effect on IT governance for Palestinian government sectors among the respondents.
- In reference to item no. (2) "BAI02 Manage Requirements Definition", the weight mean response of this item is (68.04%), mean value is (6.8) and P-Value equal (0.191) which is more than 0.05. That means the process of identifying solutions and analyzing requirements to ensure that they are in line with enterprise strategic requirements has no strong significant effect on IT governance for Palestinian government sectors.
- In reference to item no. (3) "BAI03 Manage Solutions Identification and Build", more than two-third (75.49%) of response confirms that IT solutions identification and build establishment and maintenance are in line with the requirements capable of supporting enterprise strategic and operational objectives has significant priority and effect on IT governance for Palestinian government sectors. Since mean value is (7.55) which is more than hypothesized value (6.5) and P-Value equal (0.000) which is less than 0.05.
- In reference to item no. (4) "BAI04 Manage Availability and Capacity", the weight mean response of this item is (67.84%), mean value is(6.78) and P-Value equal (0.218) which is more than 0.05. which means the balancing current and future needs of IT services and resources for availability, performance and capacity has no strong significant effect on IT governance for Palestinian government sectors.
- In reference to item no. (5) "BAI05 Manage Organizational Change Enablement", the weight mean response of this item is (65.1%), mean value is (6.51) and P-Value equal (0.961) which is more than 0.05. That means the change enablement management has no strong significant effect on IT governance for Palestinian government sectors.
- In reference to item no. (6) "BAI06 Manage Changes", the weight mean response of this item is (63.92%), mean value is (6.39) which is less than hypothesized value (6.5) and P-Value equal (0.645) which is less than 0.05. That means the change management has no significant effect on IT governance for Palestinian government sectors.
- In reference to item no. (7) "BAI07 Manage Changes Acceptance and Transitioning", the weight mean response of this item is (66.08%), mean value is(6.61) which is less than hypothesized value (6.5) and P-Value equal (0.645) which is more than 0.05. That means the acceptance of new changed environment at transitioning stage has no significant effect on IT governance for Palestinian government sectors.
- In reference to item no. (8) "BAI08 Manage Knowledge", the weight mean response of this item is (65.1%), mean value is (6.51) and P-Value equal (0.969) which is greater than 0.05. That means the knowledge management has no significant effect on IT governance for Palestinian government sectors.
- In reference to item no. (9) "BAI09 Manage Assets", around two-third of response (70.98%) considers that all IT assets are optimized the value provided by these assets, That means managing assets has strong significant effect on IT governance for Palestinian government sectors. This is confirmed since mean response value is (7.1) which is more than hypothesized value (6.5) and P-Value equal (0.017) which is less than 0.05.

62

- In reference to item no. (10) "BAI10 Manage Configuration", the weight mean response of this item is (65.88%), mean response value is (6.59) and P-Value equal (0.696) which is more than 0.05. That means configuration management has no significant effect on IT governance for Palestinian government sectors.

Overall, there are only two processes of BAI domain with mean response more than 6.5 and significance level less than 0.05 and has significant role of effecting on the priorities of IT governance for Palestinian government sectors among the respondents. These two processes are BAI03 and BAI09.

Table (6.8): The mean and test value for Domain processes: "DSS: Deliver, Service and Support"

No.	Process Name	Mean	Proportional Mean %	Test Value	P-Value (Sig)
1	DSS01 Manage Operations	7.04	70.39	2.427	0.019*
2	DSS02 Manage Service Requests and Incidents	6.75	67.45	1.047	0.300
3	DSS03 Manage Problems	7.08	70.78	2.471	0.017*
4	DSS04 Manage Continuity	7.10	70.98	2.188	0.033*
5	DSS05 Manage Security Services	7.45	74.51	4.608	0.000*
6	DSS06 Manage Business Process Controls	7.02	70.20	2.258	0.028*

* The mean is significantly different from 6.5

The results of domain DSS "Deliver, Service and Support", shown in Table (6.8) denoted that:

- In reference to item no. (1) "DSS01 Manage Operations", about (70.39%) of response ensures that IT operational service delivers outcomes as planned. That means operation management process has strong significant effect on IT governance for Palestinian government sectors. Since mean response value is (7.04) which is less than hypothesized value (6.5) and P-Value equal (0.019) which is less than 0.05.
- In reference to item no. (2) "DSS02 Manage Service Requests and Incidents", the weight mean response of this item is (67.45%), mean value is (6.75) at significance level equal (0.3) which is greater than 0.05. That means providing timely and effective response to user requests and resolution of all types of IT-related incidents has no strong significant effect on IT governance for Palestinian government sectors.
- In reference to item no. (3) "DSS03 Manage Problems", around (70.78%) of response ensures that there is a good management of IT-related problems and providing a good recommendations to prevent incidents in future. This means that the problem management has high significant on IT governance for Palestinian government sectors among respondents. Since the mean response value is (7.08) which is more than hypothesized value (6.5) and P-Value equal (0.017) which is less than 0.05.

- In reference to item no. (4) "DSS04 Manage Continuity", the weight mean response of this item is (70.98%) among the respondents that there is a good maintaining business continuity plans for IT-related services and operations and has significant effect on IT governance for Palestinian government sectors. Since mean value is (7.1) which is more than hypothesized value (6.5) and P-Value equal (0.033) which is less than 0.05.
- In reference to item no. (5) "DSS05 Manage Security Services", the weight mean response of this item is (74.51%), which means most of respondents ensures that there are good security and protection roles and procedures that minimizes the impact of operational information security vulnerabilities and incidents. This confirmed since mean value is (7.45) which is more than hypothesized value (6.5) and P-Value equal (0.000) which is less than 0.05.
- In reference to item no. (6) "DSS06 Manage Business Process Controls", most of respondents (70.2%) ensures that there are defined control processes to ensure information integrity and the security of information assets. This is confirmed since mean value is (7.02) which is more than hypothesized value (6.5) and P-Value equal (0.028) which is less than 0.05.

Overall, all DSS domain processes except DSS02 has mean value more than 6.5 at significance level less than 0.05. That means DSS domain has strong effect on IT governance for Palestinian government sectors among the respondents.

Table (6.9): The mean and test value for Domain processes:
"EDM: Evaluate, Direct and Monitor"

No.	Process Name	Mean	Proportional Mean %	Test Value	P-Value (Sig)
1	EDM01 Ensure Governance Framework Setting and Maintenance	6.43	64.31	-0.224	0.823
2	EDM02 Ensure Benefits Delivery	7.18	71.76	2.814	0.007*
3	EDM03 Ensure Risk Optimization	5.84	58.43	-2.414	0.019
4	EDM04 Ensure Resource Optimization	6.06	60.59	-1.746	0.087
5	EDM05 Ensure Stakeholder Transparency	6.98	69.80	1.961	0.055

* The mean is significantly different from 6.5

The results related to the EDM domain "Evaluate, Direct and Monitor", shown in Table (6.9) denote the following facts:

- In reference to item no. (1) "EDM01 Ensure Governance Framework Setting and Maintenance", the weight mean response of this item is (64.31%), mean value is(6.43) which is less than hypothesized value (6.5) at significance level (0.823) which is less than 0.05. That means ensuring governance framework has no significant effect on IT governance for Palestinian government sectors.

64

- In reference to item no. (2) "EDM02 Ensure Benefits Delivery", the weight mean response of this item is (71.76%), mean response value is (7.18) which is less than hypothesized value (6.5) and P-Value equal (0.007) which is less than 0.05. That means the benefits of all IT-related aspects are optimized with optimal cost in Palestinian government sectors.
- In reference to item no. (3) "EDM03 Ensure Risk Optimization", the weight mean response of this item is (58.43%), mean value is(5.84) which is less than hypothesized value (6.5) and P-Value equal (0.019) which is greater than 0.05. That means there is no strong significant effect of EDM03 on IT governance for Palestinian government sectors.
- In reference to item no. (4) "EDM04 Ensure Resource Optimization", the weight mean response of this item is (60.59%), mean value is (6.06) which is less than hypothesized value (6.5) and P-Value equal (0.087) which is less than 0.05. That means there is no strong significant effect of EDM04 on IT governance for Palestinian government sectors.
- In reference to item no. (5) "EDM05 Ensure Stakeholder Transparency", the weight mean response of this item is (69.8%), mean value is (6.98) which is less than hypothesized value (6.5) at significance level (0.055) which is more than 0.05. That means the IT-related objectives and strategies are not perfectly ensured and confirmed with stakeholders in Palestinian government among the respondents.

Overall, only the process "EDM02: Ensuring Benefits Delivery" were confirmed that has high priority with mean response (7.18) at significance level (0.007) which is less than 0.05. That means EDM02 has strong significant effect on IT governance for Palestinian government sectors among the respondents.

Table (6.10): The mean and test value for Domain processes: "MEA: Monitor, Evaluate and Assess"

No.	Process Name	Mean	Proportional Mean %	Test Value	P-Value (Sig)*
1	MEA01 Monitor, Evaluate and Assess Performance and Conformance	6.65	66.47	2.521	0.012*
2	MEA02 Monitor, Evaluate and Asses the System of Internal Control	6.18	61.76	-1.120	0.263
3	MEA03 Evaluate and Assess Compliance with External Requirements	5.41	54.12	-2.240	0.025

* The mean is significantly different from 6.5

The results related to the MEA domain "Monitor, Evaluate and Assess", shown in Table (6.10) denote the following facts:

- In reference to item no. (1) "MEA01 Monitor, Evaluate and Assess Performance and Conformance", the weight mean response of this item is (66.47%), mean value is(6.65)

65

which is more than hypothesized value (6.5) and P-Value equal (0.012) which is less than 0.05. That means there is strong significant effect on IT governance for Palestinian government sectors of monitoring, evaluating and assessing all IT-enabled processes performance and conformance.

- In reference to item no. (2) "MEA02 Monitor, Evaluate and Asses the System of Internal Control", the weight mean response of this item is (61.76%), mean value is (6.18) which is less than hypothesized value (6.5) and P-Value equal (0.263) which is less than 0.05.
- In reference to item no. (3) "MEA03 Evaluate and Assess Compliance with External Requirements", the weight mean response of this item is (54.12%), mean value is(5.41) which is less than hypothesized value (6.5) and P-Value equal (0.025) which is greater than 0.05.

Overall, only the process MEA01 has been considered as an important of MEA domain and has strong significant effect on IT governance, while the respondents considers that the processes MEA02 "internal control systems", and MEA03 "complying with external requirements" has no strong significant effect on IT governance.

To test the significant difference among respondents regarding to the priority of IT governance processes of five COBIT domains to the following independent variables: Age, Qualification, Position, Experience and Organizational level of IT division. Two statistical tests were conducted:

- Non-Parametric Kruskal-Wallis test was used to check and if there are any significant difference among respondents regarding to the MEA domain of COBIT 5 due to personal traits (Age, Qualification, Position, Experience and Organizational level of IT division).
- Parametric One-Way ANOVA test was used to check and if there are any significant difference among respondents regarding to the APO, BAI, DSS, EDM domain of COBIT 5 due to personal traits (Age, Qualification, Position, Experience and Organizational level of IT division).

Table (6.11): One-Way ANOVA test of the domains:
(APO, BAI, DSS and EDM) and their P-Values for Sample characteristics

	Age	Qualification	Position	Experience	Organizational Level IT Division
"APO domain" P-Value (Sig)	0.06	0.39	0.06	0.32	0.72
"BAI domain" P-Value (Sig)	0.12	0.66	0.18	0.45	0.47
"DSS domain" P-Value (Sig)	0.21	0.42	0.39	0.63	0.18
"EDM domain" P-Value (Sig)	0.09	0.94	0.41	0.79	0.71

66

Table (6.11) shows that the p-value (Sig.) is greater than the level of significance α= 0.05 for each listed domain, which are APO, BAI, DSS and EDM, then there are insignificant differences among the respondents regarding to these domains due to the characteristics: Age, Qualifications, Positions, Experience, and Level of IT division.

**Table (6.12): Kruskal-Wallis test of the MEA domain
and its P-Values for Sample characteristics**

	Age	Qualification	Position	Experience	Organizational Level IT Division
"MEA domain" P-Value (Sig)	0.44	0.49	0.92	0.63	0.07

Table (6.12) shows that there are insignificant differences among the respondents regarding to MEA domain due to the characteristics: Age, Positions, Experience, and Level of IT division while p-value (Sig.) is greater than the level of significance α= 0.05 due to these characteristics.

Table (6.12) shows also shows that there is a significant difference among the respondents regarding to MEA domain due to the Qualification characteristic.

It was concluded that respondents' characteristics (Age, Position, Experience, Level of IT division have no effect on the IT governance domains according to COBIT 5 framework, while respondents' qualifications has.

6.4 IT governance Processes Rating Results

To find the prioritized processes of IT governance, the second section of the questionnaire asked participants to rate the priorities of the all 37 processes of IT governance that derived from COBIT framework on a 10 point Likert-type scale. The results were collated and analyzed to produce a ranked list of high processes in order to propose an abbreviated instrument of COBIT.

Thirteen processes are the total number of processes that considerable by respondents has high significant and necessary processes for implementing IT governance framework. Where all of these 13 processes have weighted more than (65%) with mean value more than 6.5 with a significance level of less than 0.05 for the test. The rank list has presented in Table (6.13).

67

Table (6.13): IT governance processes with
Mean value > 6.5 and P-value < 0.05 ranked Descending by the Mean

Process Name	Mean	Proportional Mean %	Test Value	P-Value (Sig)	Rank
BAI03 Manage Solutions Identification and Build	7.55	75.49	4.948	0.000	1
APO02 Manage Strategy	7.51	75.10	3.925	0.000	2
DSS05 Manage Security Services	7.45	74.51	4.608	0.000	3
APO08 Manage Relationships	7.24	72.35	3.082	0.003	4
APO13 Manage Security	7.22	72.16	3.187	0.002	5
EDM02 Ensure Benefits Delivery	7.18	71.76	2.814	0.007	6
BAI09 Manage Assets	7.10	70.98	2.478	0.017	7
DSS04 Manage Continuity	7.10	70.98	2.188	0.033	8
APO01 Manage the IT Management Framework	7.08	70.78	2.099	0.041	9
DSS03 Manage Problems	7.08	70.78	2.471	0.017	10
DSS01 Manage Operations	7.04	70.39	2.427	0.019	11
DSS06 Manage Business Process Controls	7.02	70.20	2.258	0.028	12
MEA01 Monitor, Evaluate and Assess Performance and Conformance	6.65	66.47	2.521	0.012	13

It is clear from the Table (6.13) that there is no process was weighed with in highest scale range, that is between 10 – 9. But there are 12 processes are laid in the range of high priority scale that is between 8 and 7. Since the process MEA01 has mean value equal 6.65. This value is closest to the high priority scale that range between 7 and 8. So, it was taken into consideration within the high scale list.

The highest rated process was to BAI03 with average mean is 7.55. The process MEA01 is the last significant processes was averaged equal 6.65.

This research revealed 13 processes that considered by participants as highest priority processes of IT governance. This result is agreed with results and recommendations of another previous studies. The international study by Guldentops (2003) used a list of 15 processes, while the study by Huissoud (2005) used a list of 16 processes. Gerke & Ridley (2006) used a list of 17 processes. The EUROSAI IT working group recommended forming a list of 10 to 15 control objectives (Huissoud, 2005). Hiererra & Kerta (2012) used a list of only eight processes. A study of Al Omari, Barnes, & Pitman (2012) that was on COBIT 5, was revealed an abbreviated list of 12 processes. This study is listed 13 processes, which are the all processes within the range scale between 8-7, since the mean value are greater than 6.5.

The revealed highest priority list includes processes were derived from all COBIT domains: APO, EDM, BAI, DSS and MEA. Notwithstanding the priority of all domains, rankings were priority to determine the composition of the abbreviated list, as displayed in Table (6.14).

Table (6.14): Domain Analysis

Domain	No. of Domain Processes	No. of Selected Domain Processes	Selected Processes Percentage of the Domain	Domain Percentage of Other Domains
APO	13	4	30.8%	30.8%
BAI	10	2	20.0%	15.4%
DSS	6	5	83.3%	38.5%
EDM	5	1	20.0%	7.7%
MEA	3	1	33.3%	7.7%
Total	37	13		100.0%

Five processes where selected from DSS domain that represents (83.3%) of domain processes and (38.5%) of the highest priority processes list. Since four processes were selected from APO domain that represents (30.8%) of prioritized processes, while two from the BAI domains which represents (15.4%) of all list domains, while only one process was selected from the EDM and MEA domains that represents (7.7%) for each. The strong emphasis placed on the DSS and APO domains (previously DS and PO) is clear and have been observed by previous research. These domains used to attract the highest ratings amongst other processes, in the same way they did in this research.

However; the introduction of the new domain EDM has slightly changed this trend as it has quickly became one of the high priority domains within the framework by pinching (7.7%) of prioritized processes in the list.

Considering only one process from the MEA domain would indicates the focus on early cycle activities instead of those concentrating on monitoring and evaluating.

Table (6.15) presents the similarities to the findings of studies Al Omari, Barnes, & Pitman (2012) and Gerke & Ridley (2006). This result could be interpreted by the fact that the development process of e-transformation in government institutions still in its infancy.

Table (6.15): Comparison of selected COBIT domains to previous studies

	Current Research	Al Omari et al	Hiererra & Kerta	Ismail et al	Gerke and Ridley	Huissoud	Guldentops et al
Total number of processes	13	12	8	20	17	16	15
APO/PO	4 (30.8%)	3 (25%)	2 (25%)	7 (35%)	6 (35%)	5 (31 %)	5 (33%)
BAI/BI	2 (15.4%)	1 (8%)	1 (12.5%)	3 (15%)	4 (24%)	5 (31%)	4 (27%)
DSS/DS	5 (38.8%)	5 (42%)	3 (37.5%)	7 (35%)	7 (41%)	5 (31%)	5 (33%)
EDM	1 (7.7%)	3 (25%)	n/a	n/a	n/a	n/a	n/a
MEA/M	1 (7.7%)	0 (0%)	2 (25%)	3 (15%)	0 (0%)	1 (6.2%)	1 (7%)

It is no surprise that APO02 "Manage Strategy" and APO01 "Manage the IT management Framework" has been listed in the highest priority list. This could be attributed to the governmental movements to develop ICT sectors. The Palestinian government were developed two of the most IT strategic plans, and that approved and supported from Palestinian cabinet. The ministry of telecommunication and IT were charged as the responsible of implementing these plans with the stakeholders; these plans are "Palestinian ICT Strategic Plan 2013-2015" and "Palestinian e-Government Strategic Plan 2013-2015" (MTIT, 2014).

Furthermore, the fourth highest priority ranked process APO08 "Manage Relationships" is harmonized with the development and implementation the Palestinian government IT strategic plans, when find all key ministries representatives were involved. Determinates of the "Palestinian ICT Strategic Plan 2013-2015" focused on the strong relationship building with stakeholders. A good IT plans and relationships with stakeholders makes the choice of the process BAI03 "Manage Solutions Identification and Build" taken highest priority rate in the list.

Three IT governance processes that also considered as high priority processes; which are DSS05 "Manage Security Services", APO13 "Manage Security" and DSS06 "Manage Business Process Controls". This is noticed that the security issues are considered of the most critical for the public sector. Because of that, the Palestinian Government through Ministry of Telecommunication and IT with participation with specialists from government and non-government members developed "the Government Policy of Information Security" (MTIT, 2014). The Ministry of Telecommunication and IT is responsible to define and maintain process controls to ensure that all processes are comply with the security requirements.

The government reports and plans mentioned to have a continuously improvements processes in developing e-government services and enterprise solutions that serving the government, citizens, academic organizations, businesses and community. It is not allowable for these stakeholders to face any problems may effecting down in their businesses. This fact was reflected by the responders' answers. Since the processes EDM02 "Ensure Benefits Delivery", DSS04 "Manage Continuity", DSS01 "Manage Operations", DSS03 "Manage Problems" and MEA01 "Monitor, Evaluate and Assess Performance and Conformance" that rated respectively as sixth, eighth, tenth, eleventh and thirteenth.

6.5 Comparisons with Previous Studies

Six previous research were identified the most importance or priority high-level processes of COBIT framework with different geographical and organizational contexts.

In a study by Guldentops et al (2003) a panel of senior IT and audit experts had identified 15 most important thigh level processes. The European Organization of Supreme Audit Institution (EUROSAI) IT working group workshops had identified 8 most important processes and a further 8 "also considered to be important" (Huissoud, 2005). In a study done by Gerke and Ridley (2006) in the Australian State Public Sector, seventeen processes had

been identified as the most important. The study by Ismail et al.(2008) was identified twenty processes as the most important for Australian public sector. In recent studies, eight processes were selected as an abbreviated list of COBIT framework to measure the maturity level of IT governance in BINUS University in Hiererra & Kerta study (2012). Twelve processes had considered as most processes had identified in the study by Al Omari and et al. (2012).

Appendix E listed the most important processes of COBIT framework that resulted by these studies.

The findings of this research has compared to those previous studies. The Table (6.16) showed the common shared processes with other previous studies.

Table (6.16): A highest ranked list of common processes with previous studies

Current Study	Al Omari et al	Hiererra & Kerta	Ismail et al	Gerke and Ridley	Huissoud	Guldentops et al
BAI03 Manage Solutions Identification and Build			AI2 Acquire and maintain application software	AI2 Acquire & Maintain Application Software	AI1 Identify Automated Solutions	AI1 Identify Automated Solutions
					AI2 Acquire and Maintain Application Software	AI2 Acquire and Maintain Application Software
APO02 Manage Strategy	APO02 Manage Strategy	PO1 Define a Strategic IT Plan	PO1 Define a Strategic IT Plan	PO1 Define a Strategic IT Plan	PO1 Define a Strategic IT Plan	PO1 Define a Strategic IT Plan
EDM02 Ensure Benefits Delivery	EDM02 Ensure Benefits Delivery					
DSS05 Manage Security Services	DSS05 Manage Security Services	DS5 Ensure Systems Security	DS5 Ensure Systems Security	DS5 Ensure Systems Security	DS5 Ensure Systems Security	DS5 Ensure Systems Security
APO13 Manage Security	APO13 Manage Security					
DSS03 Manage Problems	DSS03 Manage Problems		DS10 Manage problems	DS10 Manage Problems & Incidents	DS10Manage Problems and Incidents	DS10Manage Problems and Incidents
DSS04 Manage Continuity	DSS04 Manage Continuity	DSS04 Manage Continuity	DS4 Ensure continuous service	DS4 Ensure Continuous Service	DS4 Ensure Continuous Service	DS4 Ensure Continuous Service
DSS06 Manage Business Process Controls		DS11 Manage Data	DS11 Manage data	DS11 Manage Data	DS11 Manage Data	DS11 Manage Data
MEA01 Monitor, Evaluate and Assess performance and Conformance		ME1 Monitor and Evaluate IT performance	ME1 Monitor and Evaluate IT performance		ME1 Monitor Process	ME1 Monitor Process
APO01 Manage the IT Managment Framework			PO4 Define the IT Organisation & Relationships	PO4 Define the IT Organisation & Relationships		
APO08 Manage Relationships						
DSS01 Manage Operations	DSS01 Manage Operations		DS12 Manage Operations	DS12 Manage Operations		
BAI09 Manage Assets						

Four categories emerge from this comparison. The first category presents a list of processes which are common with previous studies. Table (6.16) presents five of the thirteen processes (38.5%) were identified by this research have been previously identified in all previous studies as being significant in their context. Table (6.16) then illustrates the second category also contains seven of the thirteen processes (53.8%) were identified by this research were common to at least two previous study.

Given the similarities found between the research results and previous studies, there appear some evidences and perceptions support the suggestion that the priority of some processes is independent of geographical context. In view of the difference in the organizational setting between previous studies, the results also demonstrate clear evidence that the priority of some processes is also independent of organizational type.

Table (6.17): A Unique process identified

BAI09 Manage Assets

Since twelve of the thirteen most highly ranked processes identified by this research were common with highly ranked processes in other studies, which presents (92.3%), third category presents only one processes considered a unique for the Palestinian Government sector and not listed in previous studies, shown in Table (6.17), which is BAI09 process "Manage Assets".

This indicates a high measure of IT managers' awareness for optimum utilization of assets. Utilization of IT assets is a one important goal that mentioned in Palestinian e-Government Strategic Plan 2013.

It is important to notice that, the processes BAI09 is newly added to COBIT5 framework, which is not found in previous COBIT versions (ISACA, 2012).

Table (6.18): common processes listed in previous studies and not listed this research

EDM01 "Ensure Governance Framework Setting and Maintenance"
DSS02 "Manage Service Requests and Incidents"
BAI06 "Manage Changes"

Table (6.18) presents the fourth category that shows a list of three processes were considered as a prioritized processes for IT governance in previous studies, since these processes were not found in the prioritized list of this research.

6.6 Proposed Model of IT Governance

Overall, it is may be possible to derive an abbreviated model from COBIT framework for implementing IT governance for Palestinian government. A potentially starting point for such a model would be the list 16 IT governance processes, which are; highest priority of 13 high-level significant processes that revealed in this research, plus three common processes that not listed in this research but there were considered of most important processes in previous studies.

The proposed model of IT governance for Palestinian government sectors has shown in Table (6.19)

73

**Table (6.19): Abbreviated Model of IT Governance
for Palestinian Government Sector**

1.	APO01 Manage the IT Management Framework
2.	APO02 Manage Strategy
3.	APO08 Manage Relationships
4.	APO13 Manage Security
5.	BAI03 Manage Solutions Identification and Build
6.	BAI06 Manage Changes
7.	BAI09 Manage Assets
8.	DSS01 Manage Operations
9.	DSS02 Manage Service Requests and Incidents
10.	DSS03 Manage Problems
11.	DSS04 Manage Continuity
12.	DSS05 Manage Security Services
13.	DSS06 Manage Business Process Controls
14.	EDM01 Ensure Governance Framework Setting and Maintenance
15.	EDM02 Ensure Benefits Delivery
16.	MEA01 Monitor, Evaluate and Assess Performance and Conformance

Chapter Seven:
Conclusion and Recommendations

7.1 Conclusion

7.2 Recommendations

7.3 Future Work

7.1 Conclusion

This study aimed to examine prioritized high-level processes of IT governance for Palestinian government sector to propose an abbreviated model of IT governance according to COBIT 5 that be applicable for Palestinian government sector. This section examines the extent for achieving the study objectives that predetermined in advance.

Chapter one outlined a basic introduction for the study including problem context and significance. Therefore the chapter outlined the study questions, objectives and limitations.

Chapter two reviewed past literatures within the context of IT governance and related to this study. This study intersect and may similar with few literature that identified the most priority High-level processes of IT governance. But also, this study may considered the first study within the context of IT governance that addressed Palestinian situation, which based on COBIT 5 framework.

Chapter three provided a theoretical framework to the study by looking at the existing body of knowledge surrounding both IT governance concepts and definitions, five areas of IT governance, linkage and difference between IT governance and IT management also corporate governance. Furthermore, most famous of IT governance frameworks and standards were reviewed. The study derived its definition of IT governance, which was:

"The responsibility of senior and executive management to align and integrate IT with business to enable the organization to achieve its objectives and strategies through the effective and efficient use of information technology".

As a particular reference of the study, chapter three also investigated IT governance situation in Palestinian government sector. IT efforts have to be governed for Palestinian government were categorized into IT strategic plans, IT legislations and policies, IT infrastructure and e-services and higher management support.

Chapter four focused on COBIT version 5 framework. Five principles and 7 enablers are enables the enterprise to build an effective governance and management. Both governance and management areas, five domains and all 37 high-level processes of COBIT 5 were discussed in this chapter.

Chapter five examined the methodology, under which the research was conducted, while Chapter six presented and discussed the finding results.

A survey questionnaire was designed and used as a primary tool for collect data. The survey was distributed to 57 responders of IT-related managers in Palestinian government of Gaza. Fifty-one completed survey were returned without problems. The respondents' answers were analyzed using SPSS.

The excellent response rate of 89.5 % for the survey to determine the most priority processes ensured that the results were representative of the whole population.

The analysis identified 13 significant processes that weighted mean values were laid between 7.55 and 6.65 of 10 and statistically significant at α = 0.05

The revealed processes of IT governance according to COBIT 5 framework identified as being most priority for Palestinian government sector were:

APO01	Manage the IT Management Framework
APO02	Manage Strategy
APO08	Manage Relationships
APO13	Manage Security
BAI03	Manage Solutions Identification and Build
BAI09	Manage Assets
DSS01	Manage Operations
DSS03	Manage Problems
DSS04	Manage Continuity
DSS05	Manage Security Services
DSS06	Manage Business Process Controls
EDM02	Ensure Benefits Delivery
MEA01	Monitor, Evaluate and Assess Performance and Conformance

These 13 processes can be grouped into three groups. First group contains five processes of these 13 were common to at both of all listed previous studies and were considered significant in their context. These five processes were:

APO02	Manage Strategy
APO13	Manage Security
DSS04	Manage Continuity
DSS05	Manage Security Services
EDM02	Ensure Benefits Delivery

Second group contains 7 processes were common to both the current research and at least two of the mentioned sources:

APO01	Manage the IT Management Framework
APO08	Manage Relationships
BAI03	Manage Solutions Identification and Build
DSS01	Manage Operations
DSS03	Manage Problems
DSS06	Manage Business Process Controls
MEA01	Monitor, Evaluate and Assess Performance and Conformance

Third group shows a unique process to the current study were identified a one of high priority process for the Palestinian Government sector, which is newly added to COBIT 5 framework. Which was:

BAI09	Manage Assets

77

The study reviewed list of three processes were common in previous studies and considered of high priority processes for IT governance, since these processes were not found in the prioritized list of this research. The study suggested to take these processes in consideration when conduct IT governance at Palestinian government sector. These processes were:

EDM01   Ensure Governance Framework Setting and Maintenance

DSS02   Manage Service Requests and Incidents

BAI06   Manage Changes

Finally, the study proposed an abbreviated IT governance model derived from COBIT 5 framework that suggested to be suitable for Palestinian government sector. This model contains 16 high-level processes. Thirteen of these processes were ranked by respondents as significant and high priority for Palestinian Government sector and also identified by other authors as being important in other contexts except one process were a unique for Palestinian government sectors. Three processes of the proposed model are not ranked as high priority of this research but were identified of the most important processes by other previous studies.

The final suggested model of IT governance for Palestinian Government according to COBIT 5 were:

APO01   Manage the IT Management Framework

APO02   Manage Strategy

APO08   Manage Relationships

APO13   Manage Security

BAI03   Manage Solutions Identification and Build

BAI06   Manage Changes

BAI09   Manage Assets

DSS01   Manage Operations

DSS02   Manage Service Requests and Incidents

DSS03   Manage Problems

DSS04   Manage Continuity

DSS05   Manage Security Services

DSS06   Manage Business Process Controls

EDM01   Ensure Governance Framework Setting and Maintenance

EDM02   Ensure Benefits Delivery

MEA01   Monitor, Evaluate and Assess Performance and Conformance

7.2 Recommendations

In light of the aforementioned results the researcher recommends the following, wishing from Palestinian government and researchers to take them into account and put them into action:

1. Palestinian government are advised to enhance their practicing toward identifying and analyzing the requirements for the IT governance and developing effective and documented structures, principles, processes and practices with clarity of responsibilities and authority.

2. Palestinian government are advised to enhance their practicing toward Managing Service Requests and Incidents. In order to achieve increased productivity and minimize disruptions through quick resolution of user queries and incidents.

3. Palestinian government are advised to spend more efforts in Change Management. In order to enable fast and reliable delivery of change to the business and mitigation of the risk of negatively impacting the stability or integrity of the changed environment.

4. Palestinian government are advised to give more concern in standardizing their IT processes according to such the model suggested in this study.

5. Palestinian government are highly advised to adopt the proposed model of IT governance framework that suggested in this study.

6. Arab researchers are encouraged to take procedures in applying such research on other samples or sectors, especially on government sectors.

7.3 Future Work

1. Researchers are highly advised and encouraged to develop more practical methods for organizations to use in establishing and assessing IT governance, to enable IT governance to become an accepted part of organizational strategic and operational governance processes.

2. Researchers are advised to apply this field of research on others sectors such as: municipalities and higher education institutes.

3. Researchers are highly advised to develop IT governance audit measures based on the abbreviated model of IT governance that suggested in this study and trial these measures for Palestinian government sector or elsewhere.

References

Abu-Musa, A. A. (2009). Exploring COBIT Processes for ITG in Saudi Organizations: An empirical Study. *The International Journal of Digital Accounting Research, 9*, 99-126 .

Agarwal, R., & Sambamurthy, V. (2002). Principles and Models for Organizingthe IT Functions. *MIS Quarterly Executive*, 1-16.

Al Omari, L., Barnes, P. H., & Pitman, G. (2012). Optimising COBIT 5 for IT governance : examples from the public . *ATISR 2012 : 2nd International Conference on Applied and Theoretical Information Systems Research (2nd. ATISR2012).* Academy of Taiwan Information Systems Research, Taipei, Taiwan.

Al Omari, L., Barnes, P. H., & Pitman, G. (2013). *A Delphi Study into the Audit Challenges of IT Governance in the Australian Public Sector.* electronic Journal of Computer Science and Information Technology, 4(1).

Al Skafy, H., & Al- Theebeh, Z. A. (2012). The level of information technology governance in KULACOM-Jordan Company. *Basic Research Journal of Business Management and Accounts, 1*(5).

Al-Hatmi, A., & Hales, K. (2010). Strategic alignment and IT projects in public sector organization: Challenges and solutions. *European and Mediterranean Conference on Information Systems.* Abu Dhabi: UAE.

AlJohar, K., & Hamoudy, A. (2009). Information Governance Procedures: Proposed Model derived from COBIT. *Ninth Sintific Conference: Arabian Economic Situation and Future Choices.*

Annwareen. (2008). *Information Technology in an Organization's Management.*

Aray. (2012, April 24). *Aray.* Retrieved 1 12, 2014, from Aray - Palestinian Media Agency: http://alray.ps/ar/index.php?act=post&id=98278

AYGÜN, B. (2010). *UNIFICATION OF IT PROCESS MODELS INTO A SIMPLE FRAMEWORK SUPPLEMENTED BY TURKISH WEB BASED APPLICATION.* THE MIDDLE EAST TECHNICAL UNIVERSITY.

Baruch, Y. (1999). Response rate in academic studies - A comparative analysis. *Human Relations, 52*(4), 421-438.

Batista, C. (2003). *ICTs and Good Governance: The Contribution of Information and Communication Technologies to Local Governance in Latin America.* University of Brazil .

Bloem, J., Doorn, M. v., & Mittal, P. (2005). *Making IT Governance Work in a Sarbanes-Oxley World* (1 ed.). Wiley;.

Castillo, F. (2011). *AN ASSESSMENT OF THE IT GOVERNANCE MATURITY AT SL.* Department of Industrial Information and Control System (ICS) at the Royal Institute of Technology (KTH) and AB Stockholms Lokaltrafik (SL).

CheckMarket. (n.d.). *How to calculate the optimal sample size*. Retrieved Jan 27, 2014, from Check Market Survey tools: https://www.checkmarket.com/kb/how-to-calculate-the-optimal-sample-size

Crawford, D. (2006). Privacy and security in highly dynamic systems: What is your software worth? *Communications of the ACM Journal, 49*(9).

Downers, G., & Ill. (2013, may 15). *Press Release.* Retrieved August 23, 2013, from CompTIA Association: http://www.comptia.org/news/pressreleases/13-05-15/Technology_Link_to_Business_Success_Grows_Stronger_for_Companies_Worldwide_New_CompTIA_Study_Finds.aspx

ETZLER, J. (2007). *IT GOVERNANCE ACCORDING TO COBIT.* KTH University.

FRÄSÉN, H. (2007). *An IT maturity study within the Swedish non-profit governmental municipals using the CobiT framework.* KTH University.

Gartner IT Glossary. (n.d.). *IT Governance*. Retrieved September 25, 2013, from Gartner IT Glossary: http://www.gartner.com/it-glossary/it-governance/

Gerke, L. (2005). *Investigating COBIT for Information Technology Audit in the Tasmanian Public Sector.* The School of Infonnation Systems, University of Tasmania .

Gerke, L., & Ridley, G. (2006). Towards an abbreviated COBIT framework for use in an Australian State Public Sector. *17th Australasian Conference on Information Systems.*

Gerring, J. (2007). *Case Study Research: Principles and Practices.* Cambridge University Press.

Grembergen, V. (2004). *Strategies for Information Technology Governance.*

Grembergen, V., & Guldentops, D. R. (2004). *Structures, Processes and Relational Mechanisms for IT Governance.* Idea Group inc.

Grewal, P., & Knutsson, F. (2005). *IT Governance in Global Logistics Company.* Göteborg University in Sweeden.

Guion, L. A., Diehl, D. C., & McDonald, D. (2011, August). *Triangulation: Establishing the Validity of Qualitative Studies*. Retrieved August 12, 2013, from EDIS Website: http://edis.ifas.ufl.edu/fy394

Guldentops, E. (2003). Statutory Audit and IT Governance. *Information Systems Control Journal, 5*, 1-5.

Haes, S. D., & Grembergen, W. V. (2008). Analyzing the Relationship Between IT Governance and Business/IT Alignment Maturity. *the 41st Hawaii International Conference on System Sciences.*

81

Haes, S. D., & Grembergen, W. V. (2013). *An Exploratory Study into IT Governance Implementations and its Impact on Business/IT Alignment.* University of Antwerp Management School, University of Antwerp, Antwerp, Belgium.

Hardy, G. (2005). *Information Risks: Whose Business are they.* USA: IT Governance Institute.

Hiererra, S. E., & Kerta, J. M. (2012). *ASSESSMENT OF IT GOVERNANCE USING COBIT 4.1 FRAMEWORK METHODOLOGY: CASE STUDY UNIVERSITY NFORMATION SYSTEMDEVELOPMENT IN IT DIRECTORATE BINUS UNIVERSITY.* Binus University.

Huissoud, M. (2005, February 14). IT Self-Assessment Project, Current Results and Next Steps. Presentation to EUROSAI IT Working Group.

ISACA. (2012). *COBIT 5.* ISACA.

ISACA. (2012). *COBIT 5 Framework.* ISACA.

ISACA. (2012:2). *COBIT 5: A Business Framework for the Governance and Management of Enterprise IT*. Retrieved 11 3, 2013, from ISACA: http://www.isaca.org/COBIT/Pages/default.aspx

ISACA. (2012:3). *COBIT 5: Enabling Processes.* ISACA, USA. Retrieved October 8, 2012, from ISACA: http://sas-origin.onstreammedia.com/origin/isaca/COBIT/COBIT5-Tool-Kit.zip

Ismail, S., Alinda, R., Ibrahim, O., & Abd. Rahman, A. (2008). *High Level Control Objectives in the Malaysian Ministry of Education.* Universiti Teknologi in Malaysia.

ITGI. (2003). *Board Briefing on IT Governance, 2nd Edition.* Retrieved 10 20, 2013, from isaca org: http://www.isaca.org/restricted/Documents/26904_Board_Briefing_final.pdf

ITGI. (2007). *IT Governance Executive Summary*. Retrieved October 10, 2013, from Isaca Corporation: http://www.itgi.org

ITGI. (2007:2). CobiT 4.1 – Control Objectives, Management Guidelines and Maturity. United States of America.

J.Geusebroek. (2012). *Cyber Risk Governance.* Institute of Information and Computing Science.

Jaafar, N. I., & Jordan, E. (2011). An exploratory case study of governance practices for information technology (IT) projects in a government linked company. *African Journal Of Business Management, 5*(26), 10667-10706.

Joshi, A. (2013). *IT Governance Transparency: AN EMPIRICAL ASSESSMENT OF IT GOVERNANCE TRANSPARENCY.* Maastricht Research School of Economics of Technology and Organization (METEOR).

Karen, D., & Schwartz. (2007). Retrieved 2013, from IT Governance Definition and Solutions: http://www.cio.com/article/111700/IT_Governance_Definition_and_Solutions

Krey, M., Harriehausen, B., & Knoll, M. (2011). Approach to the Classification of Information Technology Governance, Risk and Compliance Frameworks. *UKSim 13th International Conference on Modelling and Simulation.*

Kumar, R. (2005). *Research Methodology A Step-by-Step Guide For Beginners.* London: SagePublications Ltd.

Lebeaux, R. (2010, 2 25). *IT governance framework helps public agencies boost service, cut costs.* Retrieved october 20, 2013, from SearchCIO.com: http://searchcio.techtarget.com/news/1394485/IT-governance-framework-helps-public-agencies-boost-service-cut-costs

Lee, C.-H., Lee, J.-H., Park, J.-S., & Jeong, K.-Y. (2008). A Study of the Causal Relationship between IT Governance Inhibitors and Its Success in Korea Enterprises. *the 41st Hawaii International Conference on System Sciences.*

Liu, Q., & Ridley, G. (2005). IT Control in the Australian public sector: an international comparison. *European Conference on information Systems.* Germany.

Lorences, P. P., & Ávila, L. F. (Eds.). (2013). THE EVALUATION AND IMPROVEMENT OF IT GOVERNANCE. *JISTEM - Journal of Information Systems and Technology Management, 10*(2), 219-234.

Marshall, P., & McKay, J. (2004). Strategic IT planning, evaluation and benefits management: The basis for effective IT governance. *Australasian Journal of Information Systems, 11*, 14-26.

Moser, C. A., & Kalton, G. (1989). *Survey Methods in Social Investigation* (Vol. 2nd edition). Gower, England: Eldershot.

Motloutsi, V. M. (2009). *The State of IT Governance in the Top 20 IT Spending Companies in South Africa.* University of Pretoria.

MTIT. (2014, Jan 20). *Strategies and Policies.* Retrieved Jan 30, 2014, from Ministry of Telecom.&IT: http://www.mtit.gov.ps/index.php?option=com_phocadownload&view=category&id=1&Itemid=137

MTIT. (2014:2, 1 1). *Reports and Statistics.* Retrieved Feb 1, 2014, from Ministry of Telcom.&IT: http://www.mtit.gov.ps/index.php?option=com_phocadownload&view=category&id=5:

MTIT Goals and responsibilites. (2013, June 25). Retrieved Aug 26, 2013, from Ministry of Telecom&IT: http://www.mtit.gov.ps/index.php?option=com_content&view=article&id=1239:2013-06-05-11-08-41-1170&catid=8&Itemid=101

Murphy, J. (2011, May 23). *How Triangulation Strengthens Action Research*. Retrieved August 12, 2013, from Bright Hub: http://www.brighthub.com/education/postgraduate/articles/112609.aspx

Mwangi, G. (2011). *IT governance maturity according to cobit: a case study of Kenya Methodist University (KEMU).* University of Nairobi.

Novotny, A., Bernroider, E. W., & Koch, S. (2012). *Dimensions and Operationalisations of IT Governance: A Literature Review and Meta-Case Study.* Vienna University of Economics and Business.

OECD. (2004). *OECD Principles of Corporate Governance.* Retrieved 11 7, 2013, from OECD: www.oecd.org/dataoecd/32/18/31557724.pdf

PBF. (2014, Feb 13). Retrieved Feb 14, 2014, from Palestinian Business Forum: http://www.pbf.org.ps/site/?q=pages/view/9200

Peterson, R. (2004). Crafting Information Technology Governance. *Information Systems Management, 21*(4).

Preittigun, A., Chantatub, W., & Vatanasakdakul, a. (2012, December). A Comparison between IT Governance Research and Concepts in COBIT5. *IRACST- International Journal of Research in Management & Technology (IJRMT), 2*(6).

RIBEIRO, J., & GOMES, R. (2009). *IT governance using COBIT implemented in a high public educational institution: a case study.* World Scientific and Engineering Academy and Society (WSEAS) Stevens Point, Wisconsin, USA.

Scott, K. M. (2007). *TOWARDS A STRATEGIC ALIGNMENT MATURITY ASSESSMENT METHOD FOR FAST MOVING CONSUMER GOODS COMPANIES* . Faculty of Management and Commerce, University of Fort Hare.

Scottsdale Institute. (2001). Closing the Governance Gap: Bringing Boards into the IT Equation. *Information Edge, 7*(7), 1-6.

Shaw, R.-s., Chung, W.-M., Cheng, C.-P., & Fu, T.-Y. (2012). Key performance indicators for information technology (IT) operational management of financial industry in Taiwan. *African Journal of Business Management, 6*(3), 1041-1053.

Simmonds, A., & Gilmour, D. (2005). *Governance of Outsourcing.* USA: ITGI.

Simonsson, M., & Johnson, P. (2006). *Assessment of IT Governance - A Prioritization of Cobit -.* KTH, Royal Institute of Technology.

Simonsson, M., & Johnson, P. (2008). *The IT organization modeling and assessment tool: Correlating IT governance maturity with the effect of IT.* KTH, Royal Institute of Technology, Stockholm, Sweden.

Simonsson, M., Johnson, P., & Wijkström, H. (2007). *MODEL-BASED IT GOVERNANCE MATURITY ASSESSMENTS WITH COBIT.* KTH, Royal Institute of Technology, Sweeden.

Smith, H. W. (1991). *Strategies of Social Research.* Rinehart and Winston.

Son, A. (2012). *Towards a method for assessing IT governance of orgenizations.* Erasmus University Rotterdam.

STAMFORD, C. (2013, June 18). *Gartner Says Worldwide Government IT Spending Flat in 2013.* Retrieved 10 29, 2013, from Gartner: http://www.gartner.com/newsroom/id/2518815

Symons, C. (2005). *Best Practices: IT Governance Framework.* Forrester Research Inc.

Symons, C., Cecere, M., Young, G., & Lamberd, N. (2005). *IT Governnace Framework, Structures, Processes, And Communication. Cambridge, MA.* Forrester Research, Inc.

Terblanche, J. (2011). *An information technology governance framework for the public sector.* Faculty of Economic and Management Sciences at University of Stellenbosch.

Thurmond. (2001). *The point of triangulation.* Retrieved August 12, 2013, from Journal of Nursing Scholarship: http://www.ruralhealth.utas.edu.au/gr/resources/docs/the-point-of-triangulation.pdf

Ticehurst, G. W., & Veal, A. J. (2000). *Business Research Methods: A Managerial Approach.* Australia: Addison Wesley Longman.

Ward, J., & Peppard, J. (2002). *Strategic Planning for Information Systems* (3rd Edition ed.). John Wiley and Sons, Ltd.

WEBB, P., POLLARD, C., & RIDLEY, G. (2006). Attempting to Define IT Governance: Wisdom or Folly? *39th Hawaii International Conference on System Sciences. IEEE Computer Society.*

Weill, P. (2004, March). IT for the non IT executive: Don't just lead, govern! Implementing effective IT governance. *MIS Quarterly Executive, 4*(1).

Weill, P., & Ross, J. (2004). *IT Governance – How top performers Manage IT Decision Rights for Superior Results.* Boston:Harvard Business School Press.

Wibowo, A. M. (2011). *IT GOVERNANCE MATURITY AT INDONESIAN STATE OWNED ENTERPRISES: CONTINGENT F ACTORS & IMPACTS.* University of Indonesia.

Wijsman, T., Neelissen, P., & Wauters, C. (2011). *IT governance in the public sector: 'top-priority'.* The Netherlands Court of Audit.

Wikipedia. (2013, August 25). Retrieved August 26, 2013, from Wikipedia: http://en.wikipedia.org/wiki/COBIT

Wikipedia. (2013, July 7). *ISACA.* Retrieved 11 3, 2013, from Wikipedia: http://en.wikipedia.org/wiki/ISACA

Williams, P. A. (2005). *IT Alignment: Who is in charge.* USA: IT Governance Institute.

Wood, D. J. (2010). *Assessing IT Governance Maturity: The Case of San Marcos, Texas.* Texas State University-San Marcos.

Zyngier, S. (2005). Knowledge Management Governance. *Encyclopaedia of Knowledge Management*.

 Deloitte-NASCIO Cybersecurity Study: State governments at risk: a call for collaboration and compliance .(2012). Deloitte and the National Association of State Chief Information Officers.

Appendix A – English Questionnaire Form

Part One: Personal Data Profile

Age: | ☐ Less than 30   ☐ 40 - less   ☐ 50 and more

Sex: | ☐ Male   ☐ Female

Qualification: | ☐ Diploma or Less   ☐ Bachelor   ☐ Master   ☐ PhD

Job Title: | ☐ Minister Deputy/ Assistant   ☐ General Director   ☐ Deuty of General Director

☐ Department Manager   ☐ Deputy of Department Manager   ☐ Head of Section

Sector | ☐ Directorate   ☐ Department   ☐ Unit   Other (mention it): ☐

Part Two:

This part of questionnaire measures the priority of IT governance processes for the Palestinian government at Gaza.

Please Indicate set your priority estimation of each the following processes from 1 to 10. Noticed that rate (10) indicates the most priority and (1) indicates the least priority.

#	Item	Priority (10) most – (1) least
1	IT management framework (management processes, organizational structures, roles and responsibilities, reliable and repeatable activities, and skills and competencies) supports the enterprise governance.	
2	Strategic IT plans are in line with the general goals and objectives.	
3	Linkage of organization different building blocks (Enterprise Architecture) has clarity identified, organized and enables increasing agility.	
4	Innovation opportunities are analyzed, created by emerging IT and planned to increase benefit from innovation in relation to the needs to improve effectiveness and efficiency.	
5	Execute the strategic direction set for investments in the field of IT	
6	Investment procedures provides transparency, accountability, enables to make informed decisions regarding the use of IT solutions and services and foster partnership with stakeholders.	
7	There are an interesting in improving of IT human resources (placement, decision rights, skills, competency)	
8	Contribution with IT increases confidence, trust in building internal and external relationships	
9	IT services and service levels meet current and future organization needs, including identification, specification, design, publishing, agreement, and monitoring of IT services, service levels and performance indicators.	
10	Review and monitor of IT-related supplier performance for effectiveness and compliance to meet requirements	
11	Define and communicate quality requirements in all IT processes, procedures and related outcomes,	
12	Continually identify, assess and reduce IT-related risk	
13	Define, operate and monitor information security policies and procedures to protect sensitive data	
14	Programs and projects managements realizes benefits and reduces the risk of unexpected delays, costs and ensures the value and quality of project deliverables.	
15	Identify solutions and analyze requirements before acquisition or creation to ensure that they are in line with enterprise strategic requirements	
16	IT solutions identification and build are established and maintained in line with the requirements capable of supporting enterprise strategic and operational objectives.	
17	Maintain IT services and resources by balancing current and future needs for availability, performance and capacity with cost-effective service provision.	
18	Prepare and commit stakeholders of the expected change management, and reduce the risk of failure.	
19	Enable fast and reliable delivery of change and mitigation of the risk of negatively impacting the stability or integrity of the changed environment.	
20	Implement safely solutions and in line with the agreed-on expectations and outcomes, and test acceptance of new environment.	
21	Provide the knowledge required to support all staff in their work activities and for informed decision making and enhanced productivity.	
22	All IT assets are optimized the value provided by these assets.	

23	Provide sufficient information about service assets to enable the service to be effectively managed, assess the impact of changes and deal with service incidents.	
24	IT operational service delivers outcomes as planned.	
25	Provide timely and effective response to user requests and resolution of all types of IT-related incidents.	
26	Identify and classify problems and their root causes and provide timely decisions to prevent recurring incidents. Provide recommendations for improvements.	
27	Establish and maintain business continuity plans for IT-related services and operations and maintaining availability of information at a level acceptable in the event of a significant disruption.	
28	Establish and maintain security and protection roles and procedures at level of access privileges, networks and infrastructure to minimize the impact of operational information security vulnerabilities and incidents.	
29	Define and maintain control processes to ensure information integrity and the security of information assets.	
30	Planning to build and implement IT governance framework	
31	Optimizing benefits of all IT-related aspects with optimal cost	
32	Ensuring that IT-related risk management procedures including risk appetite and tolerance, costs and impacts are identified and managed.	
33	Ensuring that adequate and sufficient IT-related capabilities met current and future needs in the optimal manner effectively at optimal cost.	
34	Ensuring that the IT-related objectives and strategies are in line with the organization strategies and confirms transparency with stakeholders.	
35	Monitoring, evaluating and assessing all IT-enabled processes Performance and Conformance.	
36	Continuously monitor and evaluate the internal control environment and initiate improvement actions.	
37	Ensuring that the enterprise is compliant with all applicable external requirements.	

Thank you…

Appendix B – Arabic Questionnaire Form

بسم الله الرحمن الرحيم

الجامعة الاسلامية

عمادة الدراسات العليا

كلية التجارة – إدارة الأعمال

استبانة لتحديد

عناصر حوكمة تكنولوجيا المعلومات الأكثر أولوية لدى الحكومة الفلسطينية في غزة

الأخ الفاضل.   الأخت الفاضلة .

السلام عليكم و رحمة الله و بركاته،،،

تهدف هذه الاستبانة الى تحديد اولويات تطبيق عناصر حوكمة تكنولوجيا المعلومات في المؤسسات الحكومية بغزة – فلسطين.
و يمكن تعريف حوكمة تكنولوجيا المعلومات كالتالي:

**"دور الادارة العليا و الادارة التنفيذية في الموائمة و الدمج بين تكنولوجيا المعلومات و أعمال المؤسسة بحيث يتم تمكين المؤسسة من
تحقيق أهدافها و استراتيجيتها من خلال الاستخدام الكفؤ و الفعال لتكنولوجيا المعلومات**

لذلك فان هذه الاستبانة موجهة للمستويات الادارية العليا و التنفيذية العاملة في مجالات تكنولوجيا المعلومات في الحكومة
الفلسطينية بغزة

و بما أنكم من الأكثر معرفة و خبرة في الوضع القائم، تم التوجه اليكم لتعبئة هذه الاستبانة، لذا أرجو من سيادتكم التكرم
بتعبئة الاستبانة المرفقة وإبداء وجهة نظركم في كل عبارة   فمشاركتكم مساهمة كبيرة منكم في دعم تط وير عملية البحث
العلمي في الجامعات الفلسطينية

مع العلم أن هذه الدراسة هي لغرض البحث العلمي، و إن المعلومات الواردة فيها سيتم التعامل معها بسرية تامة

و لكم مني جزيل الشكر و التقدير،،

الباحث
رامي رياض لبد
جوال رقم 0598881020
بريد الكتروني rlubbad@gmail.com

المجال الأول البيانات الأساسية

في هذا الجزء من الاستبانة، أرجو من حضرتكم التكرم بوضع علامة ☑ مقابل الاختيار الذي ينطبق عليكم.

العمر: □ أقل من 30 □ 30 – أقل من 40 □ 40 – أقل من 50 □ 50 فأكثر

الجنس: □ ذكر □ أنثى

المؤهل العلمي: □ دبلوم فأقل □ بكالوريوس □ ماجستير □ دكتوراة

المسمى التكليف الوظيفي: وكيل وكيل مساعد □ □ مدير عام □ نائب مدير عام □

□ مدير دائرة □ نائب مدير دائرة □ رئيس قسم

عدد سنوات الخبرة في المسمى الوظيفي الحالي: □□□□ سنة

مستوى قطاع تكنولوجيا المعلومات في المؤسسة: □ ادارة عامة □ وحدة □ دائرة أخرى (اذكرها): □□□□

91

www.manaraa.com

المجال الثاني أولويات تطبيق عمليات حوكمة تكنولوجيا المعلومات

يقيس هذا الجزء من الاستبانة أولويات تطبيق عمليات حوكمة تكنولوجيا المعلومات في مؤسسات الحكومة الفلسطينية بغزة.

أرجو من حضرتكم التكرم بتحديد الأولوية التي تعتقد من وجهة نظرك أنها الأكثر ملائمة.

مع ملاحظة أن رقم (10) يمثل الأكثر أولوية، و الرقم (1) يمثل الأقل أولوية

الأولوية (10) الأكثر – (1) الأقل	البند	#
	النموذج الاداري لتكنولوجيا المعلومات (الهياكل، الصلاحيات و المسئوليات، القدرات، العلاقة مع الشركاء) يدعم أهداف الحوكمة الشاملة في المؤسسة.	1
	تتوائم الخطط الاستراتيجية لتكنولوجيا المعلومات مع الأهداف و الخطط العامة.	2
	العلاقة بين مكونات المؤسسة الرئيسية (العمليا ت، البيانات، التطبيقات، بنية تكنولوجيا المعلومات ، و الموارد البشرية) واضحة و منظمة، و تساهم في تطوير و تبسيط الاجراءات.	3
	يتم تحديد فرص الابداع في مجالات تكنولوجيا المعلومات و التخطيط للاستفادة منها في تلبية احتياجات العمل وتحسين الفعالية و الكفاءة.	4
	تنفذ المؤسسة مجموعة من الاستراتيجيات الاستثمارية في مجال تكنولوجيا المعلومات.	5
	تتسم الممارسات المالية المتعلقة بتكنولوجيا المعلومات بالشفافية و المساءلة و الانصاف و تضمن مشاركة ذوي العلاقة.	6
	يوجد اهتمام في ا لارتقاء بالموارد البشرية العاملة في تكنولوجيا المعلومات (ترقيات، توظيف، تفويض، مكافئات، تطوير مهارات)	7
	تساهم تكنولوجيا المعلومات في رفع مستوى الثقة في بناء العلاقات الداخلية و الخارجية.	8
	الخدمات المتعلقة بتكنولوجيا المعلومات تلبي الاحتياجات الحالية و المستقبلية. بما في ذلك المواصفات، و التصميم، والنشر، والاتفاقات، و المتابعة، ومستويات الخدمة و مؤشرات الأداء.	9
	يتم متابعة مدى امتثال موردي الخدمات المتعلقة بتكنولوجيا المعلومات للأداء المطلوب.	10
	تعمل المؤسسة على مراجعة و متابعة متطلبات الجودة في جميع العمليات والإجراءات والنتائج المتعلقة بتكنولوجيا المعلومات.	11
	تقوم الادارة التنفيذية و بشكل مستمر على تحديد و تقييم و معالجة المخاطر المتعلقة بتكنولوجيا المعلومات.	12
	تتخذ المؤسسة مجموعة من السياسات و الاجراءات لحماية المعلومات الهامة و الحساسة.	13
	تحد عمليات ادارة البرامج و المشاريع من المخاطر الناتجة عن التأخير غير المتوقع ، و تساهم في خفض التكاليف و ضمان جودة المخرجات.	14
	يتم تحديد وتحليل متطلبات الأعمال قبل البدء فيها، و التأكد من أنها تتماشى مع المتطلبات الاستراتيجية.	15
	اختيار و تطوير حلول تكنولوجيا المعلومات يتم وفقا لمتطلبات المؤسسة و بما يدعم الاهداف الاستراتيجية والتشغيلية.	16
	يتم متابعة خدمات و موارد تكنولوجيا المعلومات بما يحقق التوازن بين استمرار توفيرها بفعالية في الوقت الحالي، و قدرتها الاستيعابية في المستقبل، مع المحافظة على الحد الأدنى للتكلفة.	17
	يتم التركيز على اعداد و تهيئة أصحاب المصلحة لعميات التغيير المتوقعة و ضمان التزامهم به ا سواء على مستوى الأعمال أو تكنولوجيا المعلومات.	18
	جميع عمليات التغيير تتم بشكل سريع و مسيطر عليها بما يضمن سلامة الانتقال للبيئة المتغيرة و استقرارها.	19
	في المرحلة الانتقالية للتغيير، يتم تنفيذ حلول امنة تتماشى مع التوقعات والنتائج المتفق عليها، و يتم اختبار مدى قبول البيئة الجديدة.	20

الأولوية (10) الأكثر – (1) الأقل	البند	#
	تعمل المؤسسة على توفير و مشاركة المعرفة اللازمة لتعزيز اتخاذ قرارات سليمة و تعزيز الانتاجية.	21
	تحقق أصول تكنولوجيا المعلومات (معدات و برامج) القيمة المرجوة منها و بأقل التكاليف.	22
	تتوفر معلومات كافية عن الموارد و القدرات المطلوبة لتقديم الخدمات المعتمدة على تكنولوجيا المعلومات، بما في ذلك تحديد علاقتها ببعضها و تأثير تغير أي منها على تقديم الخدمات.	23
	تحقق عمليات تكنولوجيا المعلومات النتائج المرجوة منها كما هو مخطط لها.	24
	في حالات الحوادث المتعلقة بتكنولوجيا المعلومات، توفر المؤسسة استجابة سريعة و دقيقة و في الوقت المناسب لجميع طلبات المستخدمين.	25
	يتم تحديد و تصنيف المشاكل و أسبابها الجذرية، و ترفع القرارات و التوصيات لمنع وقوع حوادث مشابهة.	26
	تسعى المؤسسة للتخطيط لضمان استمرار خدمات تكنولوجيا المعلومات و المحافظة على توافر المعلومات في حالات الكوارث و الاضطرابات.	27
	تتخذ المؤسسة اجراءات أمنية و وقائية على مستوى شبكات الاتصال و صلاحيات الوصول و البنية التحتية للحد من تأثير الثغرات الأمنية و الحوادث على استمرارية العمليات التشغيلية.	28
	يتم تنفيذ ضوابط رقابية تضمن سلامة و أمن أصول المعلومات المتداولة.	29
	تخطط المؤسسة لبناء و تطبيق نموذج لحوكمة تكنولوجيا المعلومات.	30
	تتم الاستفادة بالشكل الأمثل من كل ما يتعلق بتكنولوجيا المعلومات و بأقل التكاليف.	31
	الاجراءات المتخذة لادارة المخاطر المتعلقة بتكنولوجيا المعلومات و التكاليف المترتبة عليها و مستويات السماحية و تقبل المخاطرة واضحة و مفهومة و منصوص عليها.	32
	القدرات المتعلقة بتكنولوجيا المعلومات تلبي كافة احتياجات المؤسسة الحالية و المستقبلية بشكل فعال و في أدنى حدود التكلفة.	33
	جميع أهداف و اجراءات تكنولوجيا تتسم بالشفافية و الوضوح مع أصحاب المصلحة و تتماشى مع الأهداف و الاستراتيجيات العامة.	34
	يتم متابعة و توجيه أداء جميع العمليات المتعلقة بتكنولوجيا المعلومات و التحقق من توافقها مع مستويات الأداء و المعايير المطلوبة.	35
	يتم تقييم الأنظمة و الأنشطة الرقابية الداخلية باستمرار وفق معايير محددة و تتخذ الاجراءات اللازمة لتحسينها.	36
	تعنى المؤسسة بالالتزام بالمتطلبات الخارجية المعمول بها و تسعى للحصول على شهادات استيفائها.	37

أشكركم لتعبئة جميع أسئلة الاستبانة،،،،

الباحث

Appendix C – Referees who judged the reliability of the questionnaire

- Dr. Akram Samour, *Assistant Professor of Strategic Management* at IUG, *Palestine*
- Dr. Samir Safi, *Associate Professor of Statistics at IUG*, *Palestine*
- Eng. Ismael Hamada, *General Manager at Ministry of Telecom. and IT*, *Palestine*
- Mr. Khalil Hamada, *Expert English Translator at Ministry of Justice, Palestine*

Appendix D – COBIT 5 Processes in-detail

This section illustrates the processes of COBIT 5, in line with the process reference model of COBIT 5. For each process in the following table, the following information is included:

- Domain name.
- Area of the process: Governance or Management.
- Process Label: The domain prefix (EDM, APO, BAI, DSS, MEA) and the process number.
- Process name: A short description, indicating the main subject of the process.
- Process description: An overview of what the process does and a high-level overview of how the process accomplishes its purpose.
- Process purpose statement: A description of the overall purpose of the process

Note: the content of this section had adopted from ISACA (ISACA, 2012:3).

Domain	Evaluate, Direct and Monitor (EDM)		Area	Governance
Process Label	Process Name	Process description	Process purpose	
EDM01	Ensure Governance Framework Setting and Maintenance	Analyze and articulate the requirements for the governance of enterprise IT, and put in place and maintain effective enabling structures, principles, processes and practices, with clarity of responsibilities and authority to achieve the enterprise's mission, goals and objectives.	Provide a consistent approach integrated and aligned with the enterprise governance approach. To ensure that IT-related decisions are made in line with the enterprise's strategies and objectives, ensure that IT-related processes are overseen effectively and transparently, compliance with legal and regulatory requirements is confirmed, and the governance requirements for board members are met.	
EDM02	Ensure Benefits Delivery	Optimise the value contribution to the business from the business processes, IT services and IT assets resulting from investments made by IT at acceptable costs.	Secure optimal value from IT-enabled initiatives, services and assets; cost-efficient delivery of solutions and services; and a reliable and accurate picture of costs and likely benefits so that business needs are supported effectively and efficiently.	
EDM03	Ensure Risk Optimisation	Ensure that the enterprise's risk appetite and tolerance are understood, articulated and communicated, and that risk to enterprise value related to the use of IT is identified and managed.	Ensure that IT-related enterprise risk does not exceed risk appetite and risk tolerance, the impact of IT risk to enterprise value is identified and	

			managed, and the potential for compliance failures is minimised.
EDM04	Ensure Resource Optimisation	Ensure that adequate and sufficient IT-related capabilities (people, process and technology) are available to support enterprise objectives effectively at optimal cost.	Ensure that the resource needs of the enterprise are met in the optimal manner, IT costs are optimized, and there is an increased likelihood of benefit realization and readiness for future change.
EDM05	Ensure Stakeholder Transparency	Ensure that enterprise IT performance and conformance measurement and reporting are transparent, with stakeholders approving the goals and metrics and the necessary remedial actions.	Make sure that the communication to stakeholders is effective and timely and the basis for reporting is established to increase performance, identify areas for improvement, and confirm that IT-related objectives and strategies are in line with the enterprise's strategy.

Domain	Align, Plan and Organize (APO)		Area	Management
Process Label	Process Name	Process description	Process purpose	
APO01	Manage the IT Management Framework	Clarify and maintain the governance of enterprise IT mission and vision. Implement and maintain mechanisms and authorities to manage information and the use of IT in the enterprise in support of governance objectives in line with guiding principles and policies.	Provide a consistent management approach to enable the enterprise governance requirements to be met, covering management processes, organizational structures, roles and responsibilities, reliable and repeatable activities, and skills and competencies.	
APO02	Manage Strategy	Provide a holistic view of the current business and IT environment, the future direction, and the initiatives required to migrate to the desired future environment. Leverage enterprise architecture building blocks and components, including externally provided services and related capabilities to enable nimble, reliable and efficient response to strategic objectives.	Align strategic IT plans with business objectives. Clearly communicate the objectives and associated accountabilities so they are understood by all, with the IT strategic options identified, structured and integrated with the business plans.	

APO03	Manage Enterprise Architecture	Establish a common architecture consisting of business process, information, data, application and technology architecture layers for effectively and efficiently realizing enterprise and IT strategies by creating key models and practices that describe the baseline and target architectures. Define requirements for taxonomy, standards, guidelines, procedures, templates and tools, and provide a linkage for these components. Improve alignment, increase agility, improve quality of information and generate potential cost savings through initiatives such as re-use of building block components.	Represent the different building blocks that make up the enterprise and their inter-relationships as well as the principles guiding their design and evolution over time, enabling a standard, responsive and efficient delivery of operational and strategic objectives.
APO04	Manage Innovation	Maintain an awareness of information technology and related service trends, identify innovation opportunities, and plan how to benefit from innovation in relation to business needs. Analyze what opportunities for business innovation or improvement can be created by emerging technologies, services or IT-enabled business innovation, as well as through existing established technologies and by business and IT process innovation. Influence strategic planning and enterprise architecture decisions.	Achieve competitive advantage, business innovation, and improved operational effectiveness and efficiency by exploiting information technology developments.
APO05	Manage Portfolio	Execute the strategic direction set for investments in line with the enterprise architecture vision and the desired characteristics of the investment and related services portfolios, and consider the different categories of investments and the resources and funding constraints. Evaluate, prioritize and balance programmers and services, managing demand within resource and funding constraints, based on their alignment with strategic objectives, enterprise worth and risk. Move selected programs into the active services portfolio for execution. Monitor the performance of the overall portfolio of services and programs, proposing adjustments as necessary in response to program and service	Optimize the performance of the overall portfolio of programmers in response to program and service performance and changing enterprise priorities and demands.

97

		performance or changing enterprise priorities.	
APO06	Manage Budget and Costs	Manage the IT-related financial activities in both the business and IT functions, covering budget, cost and benefit management, and prioritization of spending through the use of formal budgeting practices and a fair and equitable system of allocating costs to the enterprise. Consult stakeholders to identify and control the total costs and benefits within the context of the IT strategic and tactical plans, and initiate corrective action where needed.	Foster partnership between IT and enterprise stakeholders to enable the effective and efficient use of IT-related resources and provide transparency and accountability of the cost and business value of solutions and services. Enable the enterprise to make informed decisions regarding the use of IT solutions and services.
APO07	Manage Human Resources	Provide a structured approach to ensure optimal structuring, placement, decision rights and skills of human resources. This includes communicating the defined roles and responsibilities, learning and growth plans, and performance expectations, supported with competent and motivated people.	Optimize human resources capabilities to meet enterprise objectives.
APO08	Manage Relationships	Manage the relationship between the business and IT in a formalized and transparent way that ensures a focus on achieving a common and shared goal of successful enterprise outcomes in support of strategic goals and within the constraint of budgets and risk tolerance. Base the relationship on mutual trust, using open and understandable terms and common language and a willingness to take ownership and accountability for key decisions.	Create improved outcomes, increased confidence, trust in IT and effective use of resources.
APO09	Manage Service Agreements	Align IT-enabled services and service levels with enterprise needs and expectations, including identification, specification, design, publishing, agreement, and monitoring of IT services, service levels and performance indicators.	Ensure that IT services and service levels meet current and future enterprise needs.

APO10	Manage Suppliers	Manage IT-related services provided by all types of suppliers to meet enterprise requirements, including the selection of suppliers, management of relationships, management of contracts, and reviewing and monitoring of supplier performance for effectiveness and compliance.	Minimize the risk associated with non-performing suppliers and ensure competitive pricing.
APO11	Manage Quality	Define and communicate quality requirements in all processes, procedures and the related enterprise outcomes, including controls, ongoing monitoring, and the use of proven practices and standards in continuous improvement and efficiency efforts.	Ensure consistent delivery of solutions and services to meet the quality requirements of the enterprise and satisfy stakeholder needs.
APO12	Manage Risk	Continually identify, assess and reduce IT-related risk within levels of tolerance set by enterprise executive management.	Integrate the management of IT-related enterprise risk with overall ERM, and balance the costs and benefits of managing IT-related enterprise risk.
APO13	Manage Security	Define, operate and monitor a system for information security management.	Keep the impact and occurrence of information security incidents within the enterprise's risk appetite levels.

Domain	Build, Acquire and Implement (BAI)		Area	Management
Process Label	Process Name	Process description	Process purpose	
BAI01	Manage Programs and Projects	Manage all programs and projects from the investment portfolio in alignment with enterprise strategy and in a co-ordinated way. Initiate, plan, control, and execute programs and projects, and close with a post-implementation review.	Realize business benefits and reduce the risk of unexpected delays, costs and value erosion by improving communications to and involvement of business and end users, ensuring the value and quality of project deliverables and maximizing their contribution to the investment and services portfolio.	

BAI02	Manage Requirements Definition	Identify solutions and analyze requirements before acquisition or creation to ensure that they are in line with enterprise strategic requirements covering business processes, applications, information/data, infrastructure and services. Co-ordinate with affected stakeholders the review of feasible options including relative costs and benefits, risk analysis, and approval of requirements and proposed solutions.	Create feasible optimal solutions that meet enterprise needs while minimising risk.
BAI03	Manage Solutions Identification and Build	Establish and maintain identified solutions in line with enterprise requirements covering design, development, procurement/sourcing and partnering with suppliers/vendors. Manage configuration, test preparation, testing, requirements management and maintenance of business processes, applications, information/data, infrastructure and services.	Establish timely and cost-effective solutions capable of supporting enterprise strategic and operational objectives.
BAI04	Manage Availability and Capacity	Balance current and future needs for availability, performance and capacity with cost-effective service provision. Include assessment of current capabilities, forecasting of future needs based on business requirements, analysis of business impacts, and assessment of risk to plan and implement actions to meet the identified requirements.	Maintain service availability, efficient management of resources, and optimization of system performance through prediction of future performance and capacity requirements.
BAI05	Manage Organizational Change Enablement	Maximize the likelihood of successfully implementing sustainable enterprise wide organizational change quickly and with reduced risk, covering the complete life cycle of the change and all affected stakeholders in the business and IT.	Prepare and commit stakeholders for business change and reduce the risk of failure.
BAI06	Manage Changes	Manage all changes in a controlled manner, including standard changes and emergency maintenance relating to business processes, applications and infrastructure. This includes change standards and procedures, impact assessment, prioritization and authorization, emergency changes,	Enable fast and reliable delivery of change to the business and mitigation of the risk of negatively impacting the stability or integrity of the changed environment.

100

			tracking, reporting, closure and documentation.	
BAI07	Manage Change Acceptance and Transitioning	Formally accept and make operational new solutions, including implementation planning, system and data conversion, acceptance testing, communication, release preparation, promotion to production of new or changed business processes and IT services, early production support, and a post-implementation review.	Implement solutions safely and in line with the agreed-on expectations and outcomes.
BAI08	Manage Knowledge	Maintain the availability of relevant, current, validated and reliable knowledge to support all process activities and to facilitate decision making. Plan for the identification, gathering, organizing, maintaining, use and retirement of knowledge.	Provide the knowledge required to support all staff in their work activities and for informed decision making and enhanced productivity.
BAI09	Manage Assets	Manage IT assets through their life cycle to make sure that their use delivers value at optimal cost, they remain operational (fit for purpose), they are accounted for and physically protected, and those assets that are critical to support service capability are reliable and available. Manage software licenses to ensure that the optimal number are acquired, retained and deployed in relation to required business usage, and the software installed is in compliance with license agreements.	Account for all IT assets and optimize the value provided by these assets.
BAI10	Manage Configuration	Define and maintain descriptions and relationships between key resources and capabilities required to deliver IT-enabled services, including collecting configuration information, establishing baselines, verifying and auditing configuration information, and updating the configuration repository.	Provide sufficient information about service assets to enable the service to be effectively managed, assess the impact of changes and deal with service incidents.

Domain	Deliver, Service and Support (DSS)		Area	Management
Process Label	Process Name	Process description	Process purpose	

DSS01	Manage Operations	Co-ordinate and execute the activities and operational procedures required to deliver internal and outsourced IT services, including the execution of pre-defined standard operating procedures and the required monitoring activities.	Deliver IT operational service outcomes as planned.
DSS02	Manage Service Requests and Incidents	Provide timely and effective response to user requests and resolution of all types of incidents. Restore normal service; record and fulfill user requests; and record, investigate, diagnose, escalate and resolve incidents.	Achieve increased productivity and minimize disruptions through quick resolution of user queries and incidents.
DSS03	Manage Problems	Identify and classify problems and their root causes and provide timely resolution to prevent recurring incidents. Provide recommendations for improvements.	Increase availability, improve service levels, reduce costs, and improve customer convenience and satisfaction by reducing the number of operational problems.
DSS04	Manage Continuity	Establish and maintain a plan to enable the business and IT to respond to incidents and disruptions in order to continue operation of critical business processes and required IT services and maintain availability of information at a level acceptable to the enterprise.	Continue critical business operations and maintain availability of information at a level acceptable to the enterprise in the event of a significant disruption.
DSS05	Manage Security Services	Protect enterprise information to maintain the level of information security risk acceptable to the enterprise in accordance with the security policy. Establish and maintain information security roles and access privileges and perform security monitoring.	Minimize the business impact of operational information security vulnerabilities and incidents.
DSS06	Manage Business Process Controls	Define and maintain appropriate business process controls to ensure that information related to and processed by in-house or outsourced business processes satisfies all relevant information control requirements. Identify the relevant information control requirements and manage and operate adequate controls to ensure that information and information processing satisfy these requirements.	Maintain information integrity and the security of information assets handled within business processes in the enterprise or outsourced.

Domain	Monitor, Evaluate and Assess (MEA)		Area	Management
Process Label	Process Name	Process description	Process purpose	
MEA01	Monitor, Evaluate and Assess Performance and Conformance	Collect, validate and evaluate business, IT and process goals and metrics. Monitor that processes are performing against agreed-on performance and conformance goals and metrics and provide reporting that is systematic and timely.	Provide transparency of performance and conformance and drive achievement of goals.	
MEA02	Monitor, Evaluate and Assess the System of Internal Control	Continuously monitor and evaluate the control environment, including self-assessments and independent assurance reviews. Enable management to identify control deficiencies and inefficiencies and to initiate improvement actions. Plan, organize and maintain standards for internal control assessment and assurance activities.	Obtain transparency for key stakeholders on the adequacy of the system of internal controls and thus provide trust in operations, confidence in the achievement of enterprise objectives and an adequate understanding of residual risk.	
MEA03	Monitor, Evaluate and Assess Compliance with External Requirements	Evaluate that IT processes and IT-supported business processes are compliant with laws, regulations and contractual requirements. Obtain assurance that the requirements have been identified and complied with, and integrate IT compliance with overall enterprise compliance.	Ensure that the enterprise is compliant with all applicable external requirements.	

Appendix E - Comparison between Previous studies in identifying the most important Control objectives of COBIT framework

Authors	Guldentops et al (2002)	(Huissoud 2005)	(Gerke and Ridley,2006)	(Ismail, Alinda, Ibrahim, & Abd. Rahman,2008)	(Hiererra & Kerta,2012)	(Al Omari, Barnes, & Pitman,2012)
Location	International	International	Australian/university	Malaysian/public sector	Indonesia/University	Australian/public sector
Year	2003	2005	2006	2008	2012	2012
Version	COBIT 3	COBIT 3	COBIT 4	COBIT 4	COBIT 4.1	COBIT 5
Most important control-objectives	PO1 Define a Strategic IT Plan	PO1 Define a Strategic Plan	DS5 Ensure Systems Security	PO1 Define a strategic IT plan	PO1 Define a Strategic IT Plan	DSS05 Manage Security Services
	PO3 Determine Technological Direction	AI3 Acquire and Maintain Technology Infrastructure	DS4 Ensure Continuous Service	PO4 Define the IT processes organisation and relationship	PO10 Manage Projects	EDM03 Ensure Risk Optimization
	PO5 Manage the IT Investment	AI6 Manage Changes	PO1 Define a Strategic IT Plan	PO7 Manage the IT human resources	AI6 Manage Changes	APO13 Manage Security
	PO9 Assess Risks	DS4 Ensure Continuous Service	DS11 Manage Data	DS5 Ensure system security	DS1 Define and Manager	DSS04 Manage Continuity
	PO10 Manage Projects	DS5 Ensure System Security	DS12 Manage Operations	DS7 Educate and train users	DS5 Ensure Systems Security	EDM02 Ensure Benefits Delivery
	AI1 Identify Automated Solutions	DS7 Educate and Train Users	AI6 Manage Changes	DS11 Manage data	DS11 Manage Data	APO12 Manage Risk
	AI2 Acquire and Maintain Application Software	DS10 Manage Problems and Incidents	PO8 Ensure Compliance With External Requirements	DS12 Manage the physical environment	ME1 Monitor and Evaluate IT Performance	BAI06 Manage Changes
	AI 5 Install and Accredit Systems	M1 Monitor the Processes	PO5 Manage the IT Investment	DS13 Manage operations	ME4 Provide IT Governance	APO02 Manage Strategy
	AI6 Manage Changes	PO2 Define the Information Architecture	AI3 Acquire and Maintain Technology Infrastructure	ME3 Ensure regulatory compliance		DSS01 Manage Operations
	DS1 Define and Manage Service Levels	PO3 Determine the Technological Direction	PO6 Communicate Management Aims & Direction	ME4 Provide IT governance		EDM01 Ensure Governance Framework Setting and Maintenance
	DS4 Ensure Continuous Service	PO10 Manage Projects	DS10 Manage Problems & Incidents	PO2 Define the information architecture		DSS03 Manage Problems
	DS5 Ensure Systems Security	AI1 Identify Automated Solutions	DS9 Manage the Configuration	PO6 Communicate management aims and direction		DSS02 Manage Service Requests and Incidents
	DS10 Manage Problems and Incidents	AI2 Acquire and Maintain Application Software	AI2 Acquire & Maintain Application Software	PO8 Manage quality		
	DS11 Manage Data	AI4 Develop and Maintain Procedures	AI5 Install & Accredit Systems	AI2 Acquire and maintain application software		
	M1 Monitor the Processes	DS11 Manage Data	PO9 Assess Risks	AI4 Enable operation and use		
		PO9 Assess Risks	DS8 Assist & Advise Customers	AI5 Procure IT resources		
			PO4 Define the IT Organisation & Relationships	ME1 Monitor and evaluate IT performance		
				PO3 Determine technological direction		
				DS4 Ensure continuous service		
				DS10 Manage problems		

104

www.manaraa.com