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Framework for the Adoption of Cloud Computing in Palestinian Ministry of Telecommunication and Information Technology

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الاقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Framework for the Adoption of Cloud Computing in Palestinian Ministry of Telecommunication and Information Technology

أقر بأن ما اشتملت عليه هذه الرسالة إنما هي نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، وإن هذه الرسالة ككل، أو أي جزء منها لم يقدم من قبل لنيل أية درجة عملية أو لقب علمي أو بحثي لدى أية مؤسسة تعليمية أو بحثية أخرى.

Declaration

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

Student's name: **اسم الطالب:**

Signature: **التوقيع:**

Date: **التاريخ:**

List of Abbreviations

SaaS	Software as a Service
PaaS	Platform as a Service
IaaS	Infrastructure as a Service
PITA	Palestinian Information Technology Association
GDP	Gross Domestic Product
ICT	Information and Communication Technology
IT	Information Technology
ISP	Internet Service Provider
MTIT	Ministry of Telecommunication and Information Technology
SLA	Service Level Agreement

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Framework for the Adoption of Cloud Computing in Palestinian Ministry of Telecommunication and Information Technology

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Abstract

In the Information Technology sector, cloud computing has clearly become a very strong driving force by taking over 90% of global enterprises using the cloud as major part of their business. This study aims to introduce a comprehensive framework for the adoption of Cloud Computing and to determine the influencing factors in Palestinian Ministry of Telecommunication and Information Technology from point of view of employees from the ministry. Depending on two prominent frameworks: TOE framework and Diffusion of innovation framework.

The researcher used the quantitative methodology to answer the research questions and test the hypotheses. The questionnaire was delivered to the employees and received from 69 respondents from 75 distributed surveys. In order to evaluate the internal, convergent and discriminant validity of the instrument, validity and reliability tests of panel data were performed. The linear regression analysis was deployed to test the research hypotheses

The statistical analysis presents that some factors were rejected and the others were accepted. The supported factors were: Compatibility, Security, Top Management Support, Regulatory Support, Complexity, Trialability, Organization Readiness, and Innovation Level. The rejected factors were:

Relative Advantage, Cost, Competitive Advantage, External Support, and Knowledge.

Also, a linear regression was used to test the hypotheses and come out with findings, and recommendations to consider when developing a framework to adopt.The major results and findings that Palestinian MTIT encourages and tries to adopt some projects that support the adoption process because the cloud computing helps in replacing enterprise hardware and software with their traditional technology, so the adoption factors must be revised by the ministry and take it in its considerations as a tool to develop the organization and improve its services and IT infrastructure with high quality and low cost, and cooperate the efforts between MTIT and public and private sectors, that complies with its strategy plan to achieve its goals.

Chapter One
Introduction

Introduction

1.1 Overview

This chapter introduces the Cloud Computing concept. It clearly states the problem, research objectives, research questions and expected findings. Finally, the chapter will be concluded by providing a brief description of the thesis structure.

1.2 Background

In some way or another cloud computing imitate the historic traditional mainframes in its concept where the main server act at the parent for many terminals. One of the most important definitions of Cloud computing is given by the National Institute of Standards and Technology as:

“Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics (On-demand self-service, Broad network access, Resource pooling, Rapid elasticity, Measured Service); three service models (Cloud Software as a Service (SaaS), Cloud Platform as a Service (PaaS), Cloud Infrastructure as a Service (IaaS)); and, four deployment models (Private cloud, Community cloud, Public cloud, Hybrid cloud)” (Mell & Grance, 2013).

Further, Cloud Computing can be defined as “A standardized IT capability (services, software, or infrastructure) delivered via Internet technologies in a pay-per-use, self-service way” (Staten et al., 2009).

This definition focuses more on the service model and business model of the cloud; but it ignores the deployment models (public, private, hybrid, community).

Cloud computing is an Internet-based on-demand technology where data is stored in data center contains many servers and made available to customers as a service (SaaS) and available to clients. This definition focuses on the technical part, location, device, and time of cloud computing (Kim et al., 2009).

Another definition “Cloud is a parallel and distributed computing system consisting of a collection of interconnected and virtualized computers”. This definition clarifies the relationship between Parallel and High-Performance Computing (Buyya et al., 2009).

It is clear, there is no universal definition of this new phenomenon that explains all aspects of cloud computing. It is considered one of the most important computing paradigm which helps in larger business in the technology market. In addition, all these factors will be elaborated in details in the next chapter.

A lot of worldwide enterprise companies nowadays use Cloud Computing like Microsoft create SkyDrive and Office 365, google create google docs, Salesforce.com, Facebook, Amazon, IBM, Oracle, EMC, Yahoo, etc. (Alleweldt & Kara, 2012).

1.2.1 Why the Shift to Cloud Computing?

Nowadays most of the companies struggle with the technology requirements, including the physical position of servers and software issues. It is expected that the cost of implementation, maintenance of this technology will be paid off over time through attaining better and improved performance.

So this technology "cloud computing", will save effort, cost, time and technical issues and; with their ultimate performance capabilities, will lead companies to better place in the market and easier for the management to control (Boulton, 2016).

Cloud computing becomes more and more a vital technology in the last few years, and most of the major companies already start to rely on it as the main component of its overall structure and strategies (Carlin & Curran, 2012).

Companies who realize the importance of this technology should immediately prepare themselves and their customers to use it. This requires coordination and integration between the three major parts of any organization: top, middle and first-line management.

Most Companies who use to run traditional technology are still using the same old technology. The shift to cloud technology requires a well-defined strategy from A to Z, to successfully implement it according to the size of the organization: small, medium or Enterprise (Babcock, 2010).

In addition, this strategy must include a clear plan for phases of transition from old technology to the new on in order to save the companies from management and human resources gaps and conflicts in the future and during

the implementation of the new strategy. This is achieved by creating a primary framework for adopting the new technology (Cote et al., 2013).

In addition, in the ICT sector where most companies go to cloud computing services, it is anticipated that such technology would be very effective and efficient tool to apply their needs and work through different circumstances and support economies of scale so it will be beneficial for ICT.

1.2.2 Cloud Computing in Governments

In this context, Ireland implemented ICT strategy that requires the government and ICT sectors to plan and specify their needs and target elements. This inclusive detailed approach allows the development of a more innovative and rich of experiences technology (Howlin, 2012).

This strategy must be with a plan to transit from old technology to the new single “cloud computing”, and then the companies will not face any management matters in the future during applying the strategy and the transformation plan (Porter, 1987).

Nowadays IT infrastructure services basically depending on the internet such as Web Applications that becomes a primary pillar for most organizations, now these organizations trending to cloud computing where you can find these services already exist, easy to use, highly available, and reliable, also meets dynamic business needs, so we can see how amazing this technology will serve the business management (Boulton, 2016).

According to Cisco statistics ; one of the largest enterprises in ICT market Cloud Computing; 51% of ICT executives expect cloud computing to

become the dominant sourcing; also SaaS is becoming known as the most flexible cost effective alternative solution to traditional in-house software; and Cloud computing industry is estimated to reach $160 Billion by 2012 (Tudor, 2013).

In sum, in the ICT sector, most trends go to cloud computing services can be a very effective and efficient instrument to apply their needs and go through different circumstances and support economies of scale so it will be beneficial for ICT.

1.2.3 Cloud Computing in Palestine

In the last ten years, the ICT sector in Palestine has encountered continuous growth in products and services provided to businesses, government, and households. Moreover, the ICT contribution to Palestine's GDP with an estimate of 8%, while employing 3% of the entire workforce. The Internet and social media become more prominent during the last few years that open up new investment opportunities in the ICT sector (PITA, 2012).

1.3 Problem Statement

Cloud computing is considered one of the most important technologies in the current IT world, it could be really useful for the developing countries as they do not have enough funds to have their own IT infrastructure and services.

Palestine has a special situation, in addition to being one of the developing countries; it is also an occupied country. With regard to its financial limitations and lack of resources, the researcher suggests the Cloud

Computing as a major solution for the Palestinian IT sector to save costs and improve efficiency.

The Palestinian IT sector lacks IT framework for adopting new technology, so the researcher need to form it for cloud computing infrastructure to be the framework for decisions, securing support and approval in establishing the framework infrastructure that provides similar services to a broad range of that services, that will be needed to adopt cloud computing to provide solutions occurred to data centers especially in Palestine.

Also, this framework aims at supporting the broader strategic goals of our organizations and identifies the benefits to be realized by adopting cloud computing model. Because of increasing demand on operational efficiency and the need for fast respond for continuously growing needs to improve resource utilization; this will increase the service responsiveness and accrue meaningful benefits in efficiency, agility, and innovation in Palestinian IT sector.

This research inquiry aims at helping the Palestinian Ministry of Telecommunication and Information Technology by developing a cloud-computing framework to adopt in the ministry. This will require suitable policies that embrace trust and values of sharing and giving in which all stakeholders and beneficiaries could be involved and that promises ongoing evolution and development in the sector at all levels: infrastructure, services, and user-base growth.

1.4 Significance of the Research

This research study aims at contributing mainly to develop cloud computing framework and study its determinants within Palestinian MTIT to facilitate the adoption process. Throughout the research, a body of knowledge about cloud computing planning and adoption process is created that is envisioned to allow smooth shifting of the IT sector in the organizations to robust cloud computing.

Therefore, it is anticipated that this research would generate a great deal of interest, not only among strategists and managers but also among the IT specialists, will enhance their environment with advanced technologies that will facilitate management tasks.

The main goal of this research is to introduce a framework to adopt cloud computing and its factors. This work will provide new perspectives by which to view and ameliorate ICT sector development using the cloud computing.

1.5 Research Questions

This research aims at answering the following question:

- What are the potential factors that affect the adoption of cloud computing in Palestinian MTIT?

1.6 Research Goals

The main goal of this research is to adopt and customize a standard cloud computing framework in the Palestinian MTIT. The results of this research will be presented to the Palestinian MTIT; it will advise new approaches and consideration for future development, decisions, and planning.

1.7 Structure of the Thesis

In chapter one, the researcher discussed an introduction to cloud computing that covers background, problem statement, research goals, research questions, the significance of the research, and thesis Structure.

Then Chapter two clarifies the literature review of the state of art in Cloud Computing. First, the research explores the advantages and disadvantages of Cloud Computing, and then the researcher explained the stakeholders of Cloud Computing. After that, essential characteristics of Cloud Computing and management, service models, deployment models, security, migrating to cloud computing and its strategies, also the factors that affecting the adoption of cloud computing will be discussed.

Chapter three explains the research methodology, research design, data resources, data processing, research population and research sample. In addition, chapter three discusses research tool, reliability, and validity. Furthermore, it addresses the pilot test, research hypothesis, and research procedure.

Chapter four discusses data analysis, statistical methods, answering research questions, testing research hypotheses and proposing a conceptual framework.

The last chapter is about conclusions and recommendations. Also, it explores the research limitation and future studies.

Chapter Two
Literature Review

Chapter Two
Literature Review

2.1 Overview

In the previous chapter, the researcher discusses the problem statement, research objectives, and research questions. Moreover, the research goals that must be accomplished at the end of this research. In this chapter, the research will show the literature review of the cloud computing other definitions, characteristics, deployment models, and management. Also, the research will introduce the security, service models and factors affecting the adoption process of the cloud computing.

Cisco definition, "Cloud computing is a broad term, but in our view maps to methods that deliver infrastructure, services, and software via the network on demand, and at scale. Cloud is based on a foundation of virtualization in which pools of (virtualized) resources are dynamically organized for the benefit of software applications and services" (Craig et al., 2009)

Also, Cloud Computing refers to both the software as services over the Internet and the hardware systems in the data centers, and both is called a Cloud. When a Cloud is available to the general public, it is called a Public Cloud. But the Private Cloud of the servers not available to the general public (Armbrust et al., 2009).

Cloud computing has been a buzz word in the computing field for many years now, the term has been widely used with many businesses not fully

understanding what it actually is and how it will benefit them because it was still underlying virtualization technology (Carlin & Curran, 2012).

Cloud Computing can be defined as web service oriented computing provides an environment as a service to provide software and information management in a way would be available in product format (Donnell et al., 2015).

Cloud computing is a new phrase in the technology world and it will play a major role in the computing paradigm (Luis et al., 2008). For the utmost few years, the researcher can assure the quick turnout to cloud computing services from either the user or the business companies.

There is a lot of definitions of cloud computing in many contexts, but the researcher takes the most recent and meaningful definitions, that contains the most factors that are related to the research and considered as the main definition in the important published researches.

2.2 Pros and Cons of Cloud Computing Adoption

Cloud computing is also a paradigm that contains outsourcing of computing resources with expendable resource scalability, on-demand provisioning with minimal IT infrastructure costs (Catteddu & Hogben, 2009).

At Dell, the cloud should be part of an overall strategy to Increase rate of growth, given the authority to employees and make a marked change in business. So, the researcher has to develop cloud solutions to fit the business vision and carry on the business development (Cote et al., 2013).

Also, Cloud Computing allows organizations and users to turn a better IT support for their profitable activities and keep updated with novel technologies (Dimitrakos, 2010). So, Cloud computing transform the resort from IT from a high-priced ‘capital expenditure’ to a pay-as-you-go ‘operating expenditure’ (Venters & Whitley, 2012). All these factors will affect the details of the planned strategy.

Although the cloud computing is scalable, but it has an impact on the demand at the administration and management level, so the cloud computing requires IT departments to give special attention to the organization strategic goals (Kepes, 2011).

Furthermore, listed in Table 2.1 below comparison between Pros and Cons of Cloud Computing.

Table 2.1 Compare between Pros and Cons of Cloud Computing

Pros	Cons
enables economies of scale, lead to cost savings which can be used through the significant pooling of these “configurable computing resources” (Brian, et al., 2008)	Security and Privacy; it affects the cloud computing model because there is an outside use of third-party services and infrastructure that are used to host important data (Takabi et al., 2010).
Allows organizations to focus on their core business (Brian et al., 2008).	Availability and Fault-Tolerance: level of service provided, the availability of this service, system performance and the measurements when there is something error occurred in the system that must be taken (Jansen & Grance, 2011).
Ease of Implementation, the organization can apply cloud computing quickly; no need to	Resource Management and Energy-Efficiency, the use of virtualized resource pools, CPU

purchase hardware, software licenses. (Craig et al., 2009).	usage, disk space, and network bandwidth must be sliced and shared among virtual machines running potentially heterogeneous workloads (Voorsluys et al., 2011).
Flexibility (Elasticity): can increase mobility by enabling access to business database and applications from different locations and devices (Craig et al., 2009)	Vendor lock-in and lack of standards, providers could not meet the client's requirements, and cloud computing infrastructures and their platforms do not use standard methods of storing user data and applications (Takabi et al., 2010).
Scalability, do not worry about adding additional hardware and software when the client loads increase (Craig et al., 2009)	
Access to high-caliber devices and software Capabilities of IT (Craig et al., 2009)	
Focus on Core Competencies, like operate data centers, the development, and management of software applications (Craig et al., 2009)	
Reduce the expenses of time and money on application development; Redeployment ICT staff on higher-value tasks. (Craig et al., 2009)	

Most advanced technologies need modern and High-tech hardware; which allow us to reduce the cost saving in keeping capital and operational expenses to a minimum with a reliable and manageable service platform; however, with cloud computing technologies distance and physical barriers could be seized and overcome which opens up an opportunity for Palestinian IT sector for full migration to new technologies easily.

2.3 Stakeholders

It is important to define immediately referred to cloud computing of stakeholders directly related: infrastructure suppliers, program providers, application providers and terminal users (Litoiu et al., 2010).

In addition, defines five actors in the Cloud Computing value network: Customer, Service providers, providers of Infrastructure, aggregators, Platform provider and Consulting (Leimeister et al., 2010).

Similarly, the cloud computing will be measured by cost savings and the competitive advantages it can provide (Marston et al., 2010).

The major types of authority; First, functional competencies are knowledge and sciences necessary for employees to perform their chores, and roles, differentiate according to the industry and function. Second, learning competencies are the individual characteristics of an employee that enable him/her to develop new first competency (De Hauw et al., 2011).

2.4 Cloud Computing Service Models

Leading backward to the definition of Cloud Computing includes three service models:

2.5 Software as a Service (SaaS)

The ability provided to the user is to use the provider's software running on a cloud infrastructure. (e.g., Web-based email), or a program interface. This service is the most used and cost efficient that is provided by cloud computing. It consists of the software and applications that are provided by

cloud in order to meet the specific needs of a user. The main difference of cloud software and ordinary software is that cloud software is much more scalable (Armbrust et al., 2009).

This model hides the platform or infrastructure details from the end-user client interface, and it can be managed through via web portals that are easy to use. (Lawton, 2008)

2.6 Platform as a Service (PaaS)

This service provides cloud users with development platforms which are usually equipped with software design, development, deployment and testing services. The user can deploy the cloud infrastructure or acquired applications and tools supported by the provider (Tsai et al., 2010). Also, this model usually exposes web services and can be shared through multiple personal computer applications such as online software service. So, it will support the lifecycle of software that permits the cloud clients to develop the service of the cloud and applications directly on PaaS cloud (Dillon et al., 2010).

2.7 Infrastructure as a Service (IaaS)

This model offers computing resources such as storage and networks in order to enable the user to run his own operating system and user specific applications. Comparing to the above two models (i.e. SaaS and PaaS), this model provides more flexibility for the user. The power granted to the user to provision processing, memory, networks, and so on (Mell & Grance, 2013).

Usually, IaaS virtualizes the capacities of physical resources that is required for hardware resources such as CPU, networking equipment, disk storage and provides for these virtualized resources a remote control access to the shared resources (Moreno-Vozmediano et al., 2012).

In figure 2.1 the cloud computing architecture adopted from (Zhang et al., 2010) that summarizes cloud computing service models and example on each model.

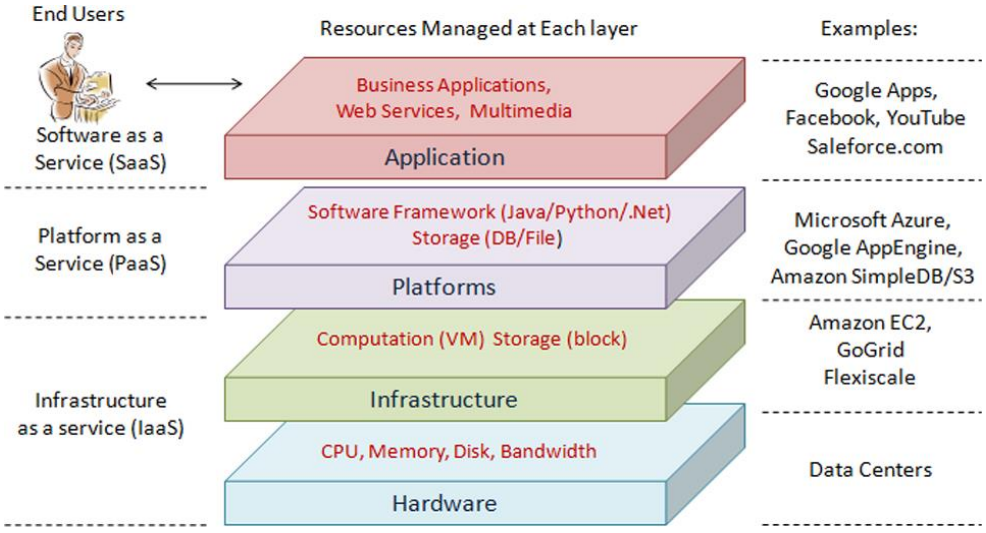

Figure 2.1: ***Cloud Computing Architecture Adopted from*** (Zhang et al., 2010)

2.8 Cloud Computing Deployment Models

The NIST definition that is defined in the introduction chapter also contained the deployment models which are public cloud, private cloud, hybrid cloud, and community cloud.

2.8.1 Public Cloud

Public clouds convey the basic perception of cloud computing, where cloud users can access the resources on the fly. Services provided by public clouds are usually accessible by the public. In public cloud models, the cloud

infrastructure is owned and managed by the cloud provider. A public cloud normally delivers services to many unrelated cloud users (Calheiros et al., 2011).

A public cloud provider may receive services from other cloud providers, and therefore, addressing the costly issues of purchasing and maintaining IT infrastructure. Normally, in public clouds, the cloud providers are in charge of managing and protecting the data in the cloud (Li et al., 2010).

2.8.2 Private Cloud

A private cloud is implemented and managed by one specific organization. While the cloud would only be accessible within a private network, the cloud infrastructure can be located and managed within the organization's data centers or in other vendor’s data centers (De Chaves et al., 2011).

The main reason for deploying private clouds is to protect the sensitive data by granting the access right only to the rightful employees of the organization. The main advantage of migrating to the private cloud is added security. Private cloud proves to be less risky. Washington Technology states that the majority of organizations are migrating from public cloud to private cloud due to security concerns. However, deploying a private cloud is less cost efficient due to the requirements for IT infrastructure (Zissis & Lekkas, 2012).

2.8.3 Hybrid Cloud

The hybrid cloud is a mixture of two above deployment models. Usually, in hybrid cloud, the cloud provider owns a private cloud that is connected to a public cloud or vice versa (Zhang et al., 2010).

Therefore, hybrid clouds enjoy the advantages of private clouds in providing solid data protection and advantages of public clouds in cost efficiency. This model usually retains the sensitive data on the private cloud and migrate the non-sensitive data and services to the public cloud (Dikaiakos et al., 2009).

The researcher thinks that this deployment model is very appropriate to our study, as we can see from the hybrid model characteristics that will use the private model which will hide the critical data and information, and use the public model to being used and accessed by people, which is required in the public sector to show or to hide according to the sensitivity of the data.

2.8.4 Community Cloud

Organizations with the same domain of demands share a community cloud. In other words, a community cloud is a private cloud that is shared among more than one organization. Therefore, many organizations can enjoy the advantages of private cloud with a lower cost. (Edureka, 2013)

So according to Garrison et al. (2012), towards Successful Cloud Deployment, it needs

1. Technical abilities and scalable IT infrastructure makes sure the integration between cloud services

2. Top Management decision: IT managers develop decision making among cloud services and implement cloud solutions complement business strategy
3. Provider-Client relationship between the IT manager and cloud provider

2.9 Cloud Computing Security

One of the most challenging issues on implementing cloud computing is security, it is related directly to the whole adoption process and considered one of the most critical issues that could impact other factors, such as choosing public or private cloud (Krutz & Vines, 2010).

As a matter of fact, any new technology will face such challenge. For that reason, it is important to convince the stakeholders to integrate cloud security strategies within their plans (Eccles & Armbrester, 2011). Part of company's strategies should be directed toward gathering more data about best practice and improving the awareness about security. Further, strategies should reflect clear security policies and transparency of cloud computing in the analysis of strategic information on cloud security. (Ramgovind et al., 2010).

2.10 Cloud Computing and Management

Similarly, the cloud computing is a process and it needs management according to its many characteristics and factors. Further organizational relevant components of cloud computing such as the multi-service models, deployment models, stakeholders, and security; are all connected to each other through management (Subashini & Kavitha, 2011).

So to make the cloud computing implementation process practical, as we can see from the hybrid model characteristics need a framework, such as “Simulator-CloudSim” to allow the users to test their services for free. However, cloud-computing coding requires a different kind of analysis comparing to traditional coding such as Java coding (Sridaran & Nirmala, 2012).To create a good implementation, they have to puzzle over many challenges like trust, security, legal, compliance and organizational challenge (Shimba, 2010).

Sometimes cloud computing becomes necessary when applications need to be deployed in a short time knowledge about the budget will help in this regard to make decisions and define components and players of cloud computing. Another management component of cloud computing under the framework of strategic business activities is the backup solution which is considered the main competency of a supplier who employs its own resources economically and efficiently (Blunt & Hine, 2010).

In putting the strategy for the company, stakeholders must consider qualities of the provider ‘Vendor’ in order to avoid future problems in system functioning and maintenance. These include: vendor viability, backup solutions and restore data approaches, the secure location of data and data loss (Douglas et al., 2010).

In addition, the manageability of the cloud is one of the largest challenges that could face the business, especially the authentication and authorization or auditing requirements so it's considered a strategic business vital component and a prerequisite (Simmhan et al., 2013).

More importantly, privacy strategies should be given special attention in cloud computing; “Consumer perceptions are not superficial, but are in fact the result of the diligent and successful implementation of thoughtful privacy strategies”. (Ponemon, 2009).

Again, the new IT organizations must build their strategic decisions based on managerial technical approaches that fit the new trend of cloud computing. Indeed, these organizations need transition and transformation from traditional to cloud computing using a framework (e.g. ITIL) that help them in harness their help desks, reduce downtime resulting because of unauthorized changes, and provide better service to their customers in order to achieve their strategic goals (Popović & Hocenski, 2010).

One of the important key issues in the strategic plan is its compliance with the vision of the organization, which should communicate very well with the cause and target of implementing cloud computing. So the roles and responsibility and agreement on expectations must be specified clearly in parallel with the strategic goals and apply the best practices in that area. (Rittinghouse & Ransome, 2010)

Thus the strategy must recognize that the cloud should be a continuous plan, it should increase the power of data processing, empower democratization, and provides help and expertise to the employees (Barga et al., 2011).

For instance, NASA has incorporated in its strategic goals: the ability of data centers to be scalable in numbers and geographic limits, incorporate the economies of scale, the platform to be open source, flexible data center and easy to construct and shared with other representations, etc. (Babcock, 2010).

In my opinion, the vision and mission of the MTIT, will comply and go through the usage of what is the more suitable to use, according to the IT sector requirements and supply the country with most advanced technologies and security within its abilities.

2.11 Migrating to Cloud

Sometimes the organization decides to move to new technology to reserve its location in the market and get the competitive advantage to overcome other companies.

"Cloud migration is the process of partially or completely deploying an organization's digital assets, services, IT resources or applications to the cloud" (Pahl et al., 2013).

It is important to know that to make a shift to cloud computing companies need to ensure that few steps are taken care of; the first step is to focus on the complexity of the organization regarding the multi-layer, interdependencies, and number of applications; the second step is to create a model that suits company’s conditions and circumstances while giving attention to the cost and constraints. The third is security policies taking into account the needed algorithms and transition scenarios. So one of the solutions to make it possible to migrate to cloud computing is to create a plan that systematically incorporates desired components needed to migrate (Hajjat et al., 2010).

When planning to migrate to the cloud, the IT managers should evaluate the physical infrastructure that must be robust and reliable to reach the desired

benefit, and this is an issue that may jeopardize the deployment of the cloud (Panduit, 2013).

Many systems do not desire to be the first one to be tested on new technologies, so they look for vendors who have the implementing and planning capabilities that were tested earlier and is working successfully (Olson, 2012).

2.12 Cloud Computing and Strategic Planning

Still, the cloud computing, planning helps the system in developing a master plan for the whole job, so they can examine their product in the cloud environment before launch it to the market (Wang et al., 2011).

The principle in formulating strategic framework techniques is done through three-stage decision making as in the following figure (2.2):

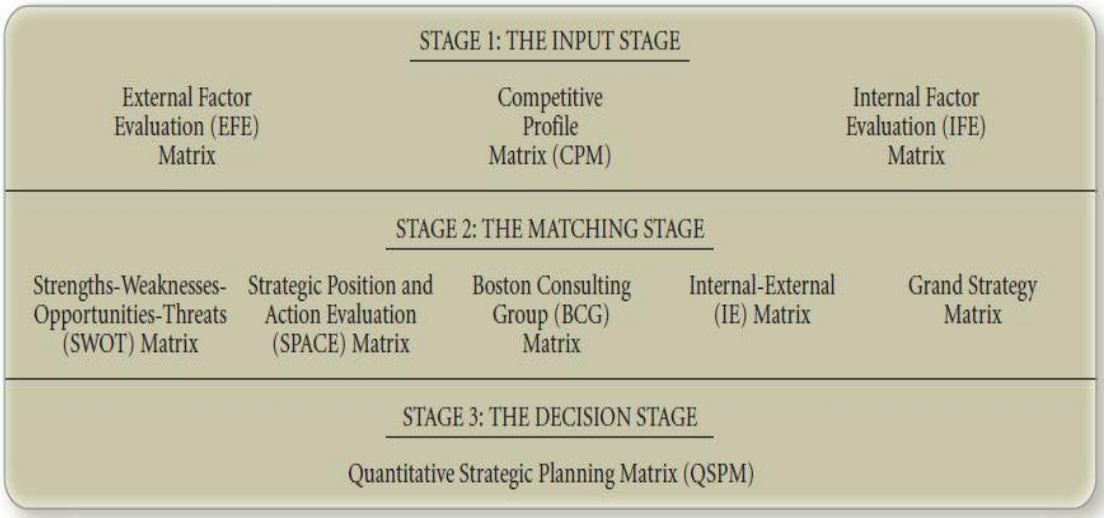

Figure-2.2: ***The Strategy-Formulation Analytical Framework*** (David, 2013)

The nine techniques included in the strategy formulation framework require the integration of science and art (David, 2013).

In the first stage, the information gained from the EFE, IFE and CPM matrices provides basic input data for the matching and decision stage matrices. Then on the second level, matching external and internal critical success factors is the key to effectively generate feasible alternative strategies using five techniques can be applied in any succession. At the terminal, decide the right scheme will comply with organizational demands (David, 2013).

Further consideration is given in this study to the analysis of the strategic imperatives of the cloud computing industry as a whole. The analysis is done within SWOT analysis, hence that we see both the opportunities and threats to the newcomer industry from an outsider view and from inside view we must be able to know the strength and weakness to overcome, and then applies it to developing a strategy (Marston et al., 2010).

To implement a strategy for cloud computing, the cultural change would be required, how to come up with this change, and how to achieve employee acceptance of the modification. In addition, Partnership/3rd party relational impact, how it increases the strength, reduce the risks and threats, create opportunities, and decrease weaknesses (Ristenpart et al., 2009).

After Knowing the benefits of the cloud computing, and the importance of putting a strategy to implement it and also a transformational plan to move to cloud the research need to develop a framework that applies these needs. Taking into consideration the type of cloud (private, public, and hybrid) and what service model (PaaS, SaaS, and IaaS) fits the type of organization and its circumstances.

According to Jabi and Jaaron (2015), the adoption of cloud computing in public sector in Palestine, that “the level of top management’s interest in cloud computing adoption is low” due to the lack of development plans to adopt cloud computing in the government, the necessary resources, integrated infrastructure with the new system and low level of awareness and training related to cloud computing skills.

2.13 Factors Affecting Cloud Computing Adoption

Many types of research in the field of cloud computing, studied the potentially influential factors to adopt cloud computing in either as a risk or opportunity and analyze these determinants to measure their importance and its effect on the adoption process. The Factors affecting cloud computing adoption decision are:

2.13.1 Reliability

The customers should know that an absence of cloud service (outage) could happen for short or long time, and it could happen once or multiple times, so this should be taken into account before adopting cloud as a solution (Buyya et al., 2009).

So far, Google and other large companies go through similar circumstances in the past, and may face it in the future; full availability in not possible. The critical application should not move to the cloud. Most of the applications that are available on the cloud are non-critical, either for backup or testing. Even the users they must make a backup of their data on other places. These days, Cloud providers try to keep a high level of reliability in SLA and to

avoid outage as possible as they can. This factor is critical to the adoption process and will categorize the type of applications that can be used in the cloud (Kim et al., 2009).

2.13.2 Security

The data security is considered one of the most critical concerns that will cause a threat to the company data which may contain critical information about it and it depends on the previous factor ‘reliability’, the system is reliable, security is achieved at one side. Thus, the full control given to the cloud provider must be protected from violation through the SLA, which solves this issue through specifications and provider contract (Rajavel & Mala, 2014).

In addition, the data does not physically exist in the company location anymore; the cloud provider will secure the data from any external threat and make the backup for the company. “Security threats are the dominant factor influencing IT executives' overall risk perceptions" (Benlian & Hess , 2011).

The security issues that "almost 75 percent of IT executives and CIOs report as their primary concern" (Marston et al., 2011). On the other hand, the security threat exists in all computers not only on cloud servers; the hackers will always find a way to hack any computer system (Kim et al., 2009).

The security of the cloud server can be enhanced by experts as we can secure the computer system using the right methods and technologies, also using the last updated software and hardware that have the highest level of security of servers and the application’s (Yu et al., 2010)

2.13.3 Performance

The performance indicator also relies on security and reliability factors and can be measured by the quality of the connection between the cloud server and the customer. Performance is judged by system stability when many users connecting to the cloud server at the same time and huge data exchange between them occur; the performance will either remains steady if the cloud server had high level of accumulating too many connections, or it will slow down or crash if the connections are too much (Zia & Khan, 2012).

Moreover, the bandwidth and processing requirements should be measured before the adoption decision, considering current and future expansions should take it into account (Venkatesh & Davis, 2000).

2.13.4 Scalability

This factor is interrelated to performance factor, in order for the system to adjust to client increasing demands and higher level requirements, the cloud provider should be ready to expand their resources and infrastructure to apply the demands of his customers and the new technology requirements of capacity, processing, and bandwidth (Leavitt, 2009).

Also, scalability considered as one of the main points that give the cloud provider opportunity to be ahead of others. This is the natural result of changes in the size of client infrastructure either up or down, including the flexibility of high-level strategy (Motahari-Nezhad et al., 2009).

2.13.5 Compliance and Physical Location

There are no such laws and regulation at governmental level that covers cloud computing issues because of it still new and no boundaries regarding the data storage by large companies on a third party, to share the computing facilities with others. On the other hand, the old rules that are currently in use regarding privacy and access to data and access for enterprises are in reality violated by the cloud technology (Pearson, 2013).

The location of the data and selection physical server to store it is not guaranteed, and some of the providers have policies to keep this information unknown to the user. So, some cloud providers try to adapt and solve this issue with local rules. The cloud computing regulation at the three levels: international, national, and local, will delay the progress in the cloud computing adoption process according to the risk of compliance with rules and regulations (El Aguez et al., 2016).

2.13.6 Integration

Integration refers to the need to interact wisely with market needs by collaboratively fulfilling different type of applications by divergent cloud providers. Moreover, the different adoption deployment models by companies that they use a hybrid cloud instead of the public cloud due to their adoption strategy (Mircea & Andreescu, 2011).

The data between the applications must achieve the integrity between them, but this integration will face challenges on both sides' technical and business for the adopters and providers of the cloud (Rimal et al., 2011).

They use web service to solve the data integration problem called “Mashups” which provides functionality relying on different resources, these services can be real opportunity in cloud computing data integration by integrating two services into one new service, for example, Amazon’s “GrepTheWeb” cloud Mashups (Di Lorenzo et al., 2009).

2.13.7 Environmental Issues

Many communities take serious responsibility for decreasing the levels the carbon footprint and try to minimize it as much as they could and to take care of their environment. Green IT in the 21st century becomes a very popular term in both fields IT and Environmental Science. Indeed, migrating to the cloud will not only reduce the resources that build the infrastructure, rather it will also consume the energy in an intelligent way (Chapman, 2010). On the other hand, other studies see that some of the cloud providers who use a huge amount of cloud servers will not follow the standards of efficient use of energy, so that will not reduce the carbon emissions necessarily (Berl et al., 2010).

2.13.8 Cost

Most of the companies spend a big part of their balance on IT infrastructure, although they utilize less than 10% of their system resources taking into consideration the replacement every three years including maintenance and administration. "Economies of scale for data centers cost savings can lead to a five to a seven-time reduction in the total cost of computing" (Marston et al., 2011).

Moreover, cloud computing solution is the best choice for small companies which can reduce the cost by using a high level of IT infrastructure with low cost relatively, while these high-performance servers were available for enterprise companies only (Greenberg et al., 2008). But there is some possible hidden additional cost that is not expected resulted from customization required by cloud adopters to fit their specific services and demands, so they will be responsible for maintaining the customized cloud, which will cost extra than what was planned for (Yigitbasioglu, 2014).

Kim et al (2009) Argue that the cloud adopters cannot completely depend on the providers to maintain and administer their cloud solution; the adopters still need extra time and cost to maintain their resources and monitor system performance; in addition, they might need additional bandwidth for future expansion, and this will infer additional cost. The cloud adopters must choose the best cost strategy to comply with their requirements.

2.13.9 Innovation

Innovation has been defined as "the generation, development, and adaptation of novel ideas on the part of the firm" (Damanpour, 1991). An innovative technology like Cloud computing, increase the functionality and efficiency of employees comparing to traditional one, also it results in new types of applications, consequently the IT department employees will be involved in the creation of new core business applications, rather than the routine tasks like daily backup and maintenance (Kim et al., 2012).

2.13.10 IT Department's Stand and Changes

Some IT Specialist sees that the cloud computing solution as a challenging threat, while some see it as an innovative solution that will simplify the IT operations. In different words, the daily tasks they do will be outsourced to a third party company, which threat their job security. Also, the companies might see the cloud adoption as the main change in handling IT operations, which is different from what they used to do for a long time in dealing with these operations (Zardari & Bahsoon, 2011, May).

This psychosocial risk is very important to both the company and IT specialists. This risk is defined by the foreseen threat by IT Specialists of outsourcing the IT operations which can lead to losing jobs, and this cause failure to the IT department which would harm the reputation of IT managers, so that the IT managers might resist the adoption decision and to the Cloud Computing technology (Greer et al., 1999).

2.13.11 Cloud Model

The type of application will decide to implement or not in the public cloud, after studying this issue by the company to adopt the cloud computing as a solution. Some companies have critical and sensitive data that requires a high level of privacy and availability such as hospitals and banks. In this type of applications are better implemented on a private cloud. At the same time, these organizations might use other types of cloud depend on what their needs are (Iyer & Henderson, 2010).

The public cloud services provide different functions from the private cloud. They are usually used for common purposes such as CRM systems, but the private cloud will give more control over the service to the owner than the public cloud, also give some customization that suits the applications (Khan & Malluhi, 2010).

Sometimes the advantages of both public and private cloud depend on some types of applications, it is called hybrid cloud model; in this model when the capacity of the private cloud reaches its limit, we start using the public cloud space moving the load from private to public cloud. Also, the hybrid cloud adds new features as both have the same file system, Hypervisor, and instruction set for their servers (Sotomayor et al., 2009).

2.13.12 Time to Market

This factor should be considered important by the cloud computing adopters. The time to market with cloud technology can reduce the procurement operation to both software and hardware from months to weeks or even less to the cloud adopters. This gives the adopter the time and capital investment to purchase the hardware when the application requires to run at maximum load. (Abhinav, 2011).

This criterion will help the adopter launch new products to the market much faster than in previous models within its culture and goals (Varia, 2013).

2.13.13 Ease of Use

An ease of use factor determines the success of the application or not, through the user experience in human-computer interaction as a major

criterion. The traditional systems like grid computing will not improve the user experience such like the cloud computing adoption. Therefore, the cloud computing adoption makes the ease of use achievement more easily, also the availability of valuable resources can be accessed smoothly by cloud adopters (Gong et al., 2010).

Jabi and Jaaron (2015) used a qualitative exploratory approach to understanding the relationship between cloud computing implementation and the factors that affect the adoption in the Palestinian public sector organizations in IT departments.

All these factors are interrelated and dependent on each other's so that they are integrated together to build the cloud computing framework. This integration could help reduce risk and challenges and adopt successful and reliable cloud computing framework.

2.14 Technology-Organization-Environment (TOE) Framework and Diffusion of Innovation (DOI) Framework

The Previous factors that affect the adoption process of cloud computing, can be studied under published frameworks that are created mainly to reach their results. One of these models is TOE framework; which concentrates on main three factors that form its name, T for Technology, O for Organization, and E for Environment. The other one is DOI framework (Diffusion of Innovation theory).

TOE framework is heterogeneous viewpoints put forward by Rocco DePietro, Edith Ward and Mitchell Fleischer (DePietro, Wiarda, & Fleischer, 1990).

Many research studies have shown that the TOE model has been implemented in broad applications and has power across many industrial, national/cultural, and technological contexts. Also, TOE has been used in the new technology adoption decision inside the firm systems (Mishra et al., 2007), but the researcher needs both DOI and TOE so that the TOE will underpin the understanding of IT adoption behavior if the organization and DOI will clarify the individual behavior in it.

There is a similarity in their concept, both TOE and DOI framework at the organizational level. Theories such as diffusion of innovation are looking at how new technologies are diffused and adopted by the firm, and DOI framework applied to many studies in the field. (Rogers E. , 2003)

Oliveira & Martins (2011) Suggest to add the environment factor to DOI as in TOE, to make it easier to explain the adoption decision inside the firm.

The TOE framework gets over the domination at the technical point of view and gives a useful analytical tool to differentiate between the inherent qualities of an innovation and the motivations (Rui & Wu, 2007).Most of the studies on adoption new technology derived from the two prominent, DOI and TOE theories (Oliveira & Martins, 2011).

So, the research will mainly focus on two prominent model, the TOE, and DOI framework, so that the DOI variables that are related to the main subject such as trial ability, IS characteristics, relative advantage, organizational

characteristics, observability, complexity, compatibility, and decision-maker characteristics. The successful implementation of TOE framework is found in big studies like Iacovou et al. (1995) and Kuan & Chau (2001), and applied in applications at enterprise systems such as Ramdani & Kawalek (2008), in electronic commerce like Scupola (2003) and Seyal et al. (2004), Electronic data interchange Kuan & Chau (2001), internet Tan & Teo (1998) and communication technologies Premkumar & Roberts (1999).

2.14.1 TOE Framework

The three main factors of the TOE framework are the technological context, the organizational context, and the environmental context ***presented in (Figure 2.3)***.

2.14.1.1 Technological context

The technological context contains all the relevant technologies to the company, the technologies that used the firm likewise updated ones that exist in the market. The used technologies in the company are important in the adoption process so that setting the broad limit on the scope and measure the technological change that the company should make (Collins et al., 1988).

The existence of innovation in the firm even if not used will also affect the innovation by matching off the limits of what can be applied and by drawing the map to choose which technology can adopt and evolve the firm. Innovation has been grouped into three types: incremental, synthetic, or discontinuous changes (Tushman & Anderson, 1986).

The incremental innovation produces new features to the existing technology, these represent to the adoption firm the minimum change and risk. The synthetic innovation change introduces the moderate change so that the technologies are integrated in a newer way to innovate.

The discontinuous innovation change produces significant departures from the used technology, examples include the adoption of change from mainframes to personal computers at many firms in the 1980s or adopting at early 2000s the cloud computing technology.

The incremental and synthetic change allow the industries to adopt the innovation by measured steps. But the discontinuous change will demand the firm to make the adoption decisions quickly to keep and evolve the competitive advantage. So, the firm must differentiate when evaluating the technologies that cause discontinuous change, whether they are "competence-enhancing" or "competence-destroying" (Tushman & Anderson, 1986). Competence-destroying it means that innovations provide many technologies and many types of obsolete experience and it causes critical shifts in industries, while competence-enhancing enable the firm to change as they can create depend on in their experience. For example, the shift to cloud computing may confirm to be a competence-destroying change technology.

After all, the firm must consider the type of the technology change carefully before adopt it, because some types will impact directly the firm and the industry which competes on. And both internal and external technologies related to the organization, which already used in the company, as those

available in the marketplace, but still not used, that includes either practice or equipment. (Baker, 2011).

2.14.2 Organizational Context

This factor is related to the management hierarchy and size, also resources and characteristics of the company, including connection structures among employees, how much slack resources, and the communication process inside the firm. This factor affects the adoption-decision and implementation in many ways. First, the linking mechanism between internal subunits of the firm or the internal boundaries extension to promote innovation (Galbraith, 1973; Tushman & Nadler, 1986). The adoption process associated with the existence of boundary spanners, product champions, and gatekeepers, all these considered informal linking agents. Other examples of mechanisms such as cross-functional employees and teams which can informal or formal links to other partners of the value chain or departments.

The purpose of studying the organization structure to recognize its relationship to the process of innovations. Also, the adoption is associated with the structure of the organization being decentralized or organic (Burns & Stalker, 2013; Daft & Becker, 1978). The mechanistic organization structure is more suitable for centralized decision making, more formal reporting, and the roles of employees are clearly defined. So, these best suited in the implementation stage of the innovation process (Zaltman et al., 1973).

To spread out the innovation, the Top management should accept suggestions about change and must be supportive of the innovation that related to its vision and mission. Also, the leadership of top management must define the role of innovation and its effect on the overall strategy and subordinates, how the firm used the innovation in the past, and build a team with high skills to cast the future vision of the firm. (Tushman & Nadler, 1986).

Slack and size are additional factors affect innovation, while slack support adoption (Rogers E. M., 1995), the innovation process can take place without it. But it is considered useful and desirable, "neither necessary nor sufficient for innovation to occur" (Tornatzky & Fleischer, 1990). The relationship between innovation and size does not exist. The large organization is likely to adopt an innovation (Kamien & Schwartz, 1982), but some researches consider the size is useful and could affect some factors such as specific resources availability (Kimberly, 1976).

2.14.3 Environmental Context

The arena which the organization conducts with its business, service provider, internal or external competitors, and the factors from the surround of the firm, includes the structure of the industry and availability of the technology service provider. For example, the competition motivates the innovation adoption (Mansfield et al., 1977).

Researchers argued that firms tend to innovate quickly when the industry is growing rapidly, so innovation methods are not always specific (Tornatzky

& Fleischer, 1990). The efficiency initiatives used by the firm to innovate by expanding the business new line. But some firms try to minimize the cost by avoiding the investment in the innovation process.

The adoption of any new technology requires improvement of the infrastructure of the firm that will impact the innovation. The high skilled labor with high wages, considered to be innovative through labor-saving innovations (Globerman, 1975). Also, the availability of technology service supplier such as consultant and skilled, labor will foster the innovation in the firm (Rees et al., 1984).

The government regulation can be either a limitation or beneficial factor on adoption of innovation processes. The legislated laws constraint on industry by the government, for instance, the green energy that controls the pollution will provide safe industry on the environment, so the firm will adopt new technology that is eco-friendly (Baliga et al., 2010)

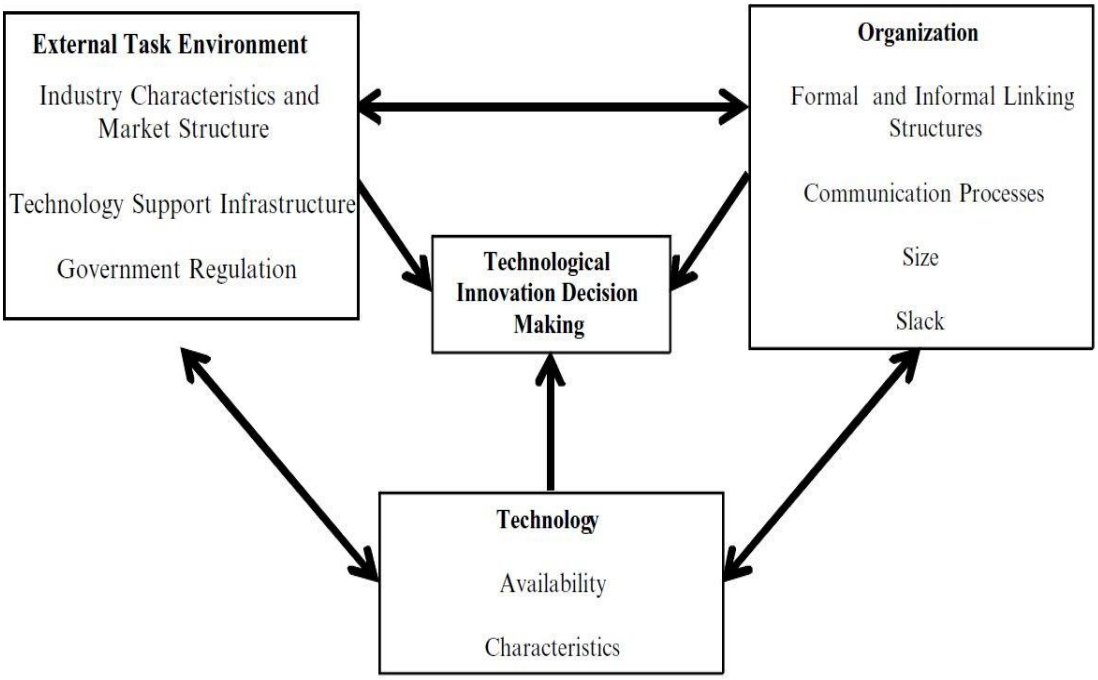

Figure 2.3: ***the technology–organization–environment framework*** (Tornatzky & Fleischer, 1990)

These three elements create both opportunities and challenges for adoption new technology (Tornatzky & Fleischer, 1990)

2.14.4 DOI Framework

The other framework is DOI model for adoption (Rogers E. M., 1995) presented in (Figure 2.4) is a theory of why, how, and at what rate the new technology and ideas will spread out through the firm culture and individual, which has five stages that will affect the adoption decision making process. The adoption of the new innovative idea is complex, it involves both the opponents and supporters of the new technology and each has its own role in the adoption decision.

At the firm level, DOI theory the innovation process is related to independent factors such as individual characteristics, external characteristics and internal organizational structural characteristics of the firm. (Rogers E. M., 1995)

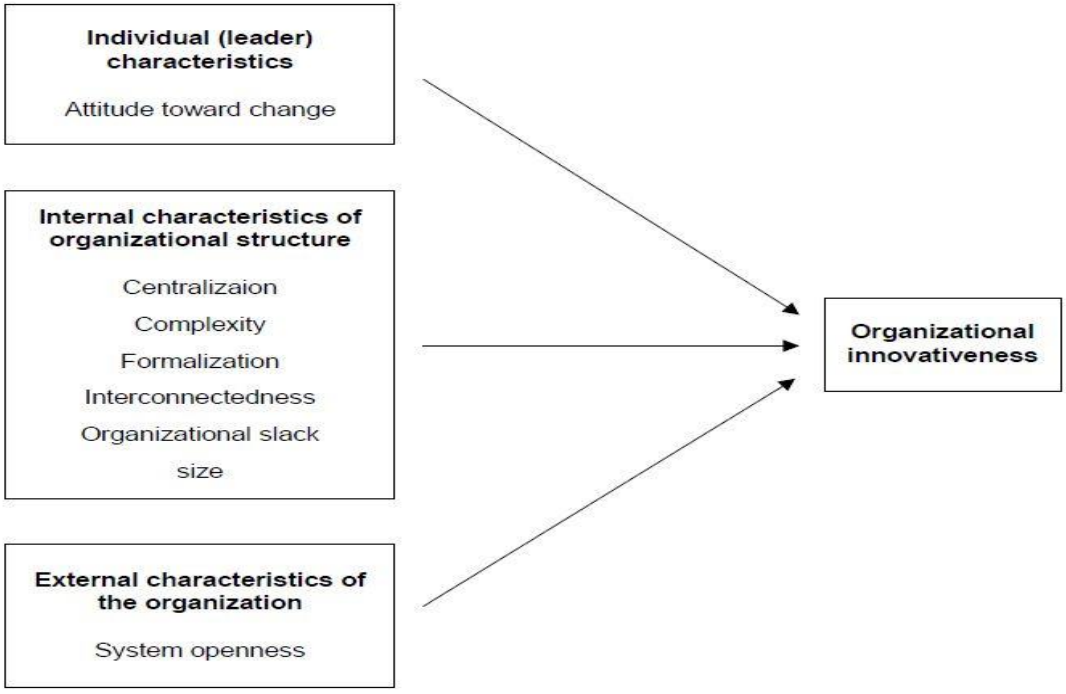

Figure 2.4: ***Diffusion of innovations framework*** (Rogers E. M., 1995)

2.14.5 Individual characteristics

This factor illustrates the leader behavior and attitude toward change and new ideas.

2.14.6 External characteristics

Considered how much the system is opened to accept new innovative technologies

2.14.7 Internal characteristics

Includes many variables according to (Rogers E. M., 1995) and they are:

1) Complexity “is the degree to which an organization’s members possess a relatively high level of knowledge and expertise”.
2) Centralization “is the degree to which power and control in a system are concentrated in the hands of relatively few individuals”.
3) Interconnectedness “is the degree to which the units in a social system are linked by interpersonal network”.
4) Formalization “is the degree to which an organization emphasizes its members’ following rules and procedures”.
5) Size “is the number of employees of the organization”.
6) Organizational slack “is the degree to which uncommitted resources are available to an organization”.

Why the researcher need both frameworks TOE and DOI to study in our Palestinian case study?

Cloud computing is still in its early stages of diffusion in Palestine; therefore, studying its adoption process is very useful that will helps cloud providers recognize the factors that influence the decision to adopt cloud computing.

Among these theories, DOI is one of the most commonly used theories that try to explain and predict the adoption of innovations. DOI is a theory developed by Rogers which is originated from Sociology field (Rogers, 1962). The majority of these theories explain and predict the adoption decision, based on factors that are related to the technology itself (such the characteristics of the technology, or users' perception about the technology). However, technology-related constructs are not the only factors that influence the adoption of technologies. There are other factors (such as environmental and organizational factors) that influence the decision to adopt an innovation. These factors, specifically environmental factors, are not taken into account in DOI. Technology- Organization-Environment (TOE) is another theoretical framework that overcomes this drawback. This framework not only uses technological aspects of the diffusion process but also non-technological aspects such as environmental and organizational factors. None of these 30 Factors Influencing the Adoption of Cloud Computing by SMEs models are flawless, and each of them has its own shortcomings. In this research paper, I proposed a research model based on DOI and TEO. I believe this model explain the adoption of the technology (in particular cloud computing) more accurately.

2.15 Summary

Tornatzky and Fleischer create the TOE framework that has three key determinants that will affect the adoption of new technology. In our study is cloud computing and they are technology, organization, and environment. This framework has been used in many successful studies within firms. Mainly this framework has been conducted in the literature review and investigates its main three factors in details to create the framework for adoption.

Chapter Three

Research Methodology

Chapter Three

Research Methodology

3.1 Overview

This chapter represents the research methodology and research design that will be used in this study. It will begin with the methodology that was used in general. Then the study population and sample. It also discusses the participants and data collection process, and the resources used to conduct this research. Furthermore, this chapter discusses also the expected output and the ethical considerations of the research.

Since the purpose of this study is to identify the determinants that will affect the adoption of the Cloud Computing in ICT sector, which will be applied to the Ministry of Telecommunications and Information Technology (MTIT) in Palestine. The descriptive analytical approach is used in this research. The researcher tried to test the factors that influence the MTIT to develop that framework for adoption of the cloud computing.

3.2 Research Design and Methodology

The research employs a quantitative approach for conducting cloud computing framework adoption. Quantitative data such as end user's feedback on the IT applications contribute to the technical impact on efficiency and productivity. Qualitative data such as business domain, business services and IT application cost drivers are used to determine the business value of the IT applications in an organization.

The quantitative methodology is a method that has different aspects to quantify and measure a specific phenomenon (Blaikie, 2009).In this study, the researcher developed a questionnaire, and ask the participants to fill it out. In this way, the knowledge of the participant's which rely on their experience is measured quantitatively and statically analyzed. The next section will briefly discuss the details of the questionnaire and its analysis. Figure 3.1 shown below illustrate a diagram of tools of research

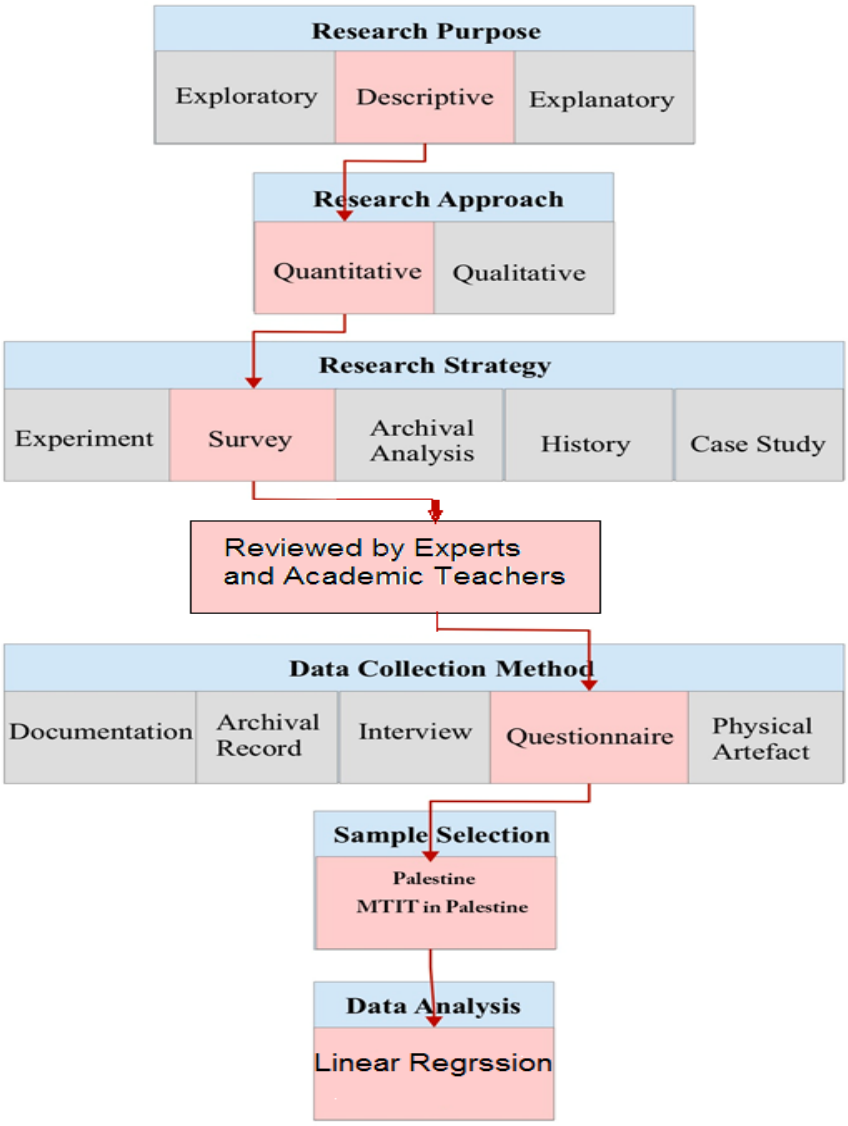

Figure 3.1: Diagram of Tools of Research

3.3 Data Resources and collection

The research will start with secondary resources such as:

1) Articles published papers and referred previous studies in different countries which have been conducted on the same subject.
2) Books and references related to strategic planning for IT.
3) The published reports from Ministry of telecommunications and information technology sectors.
4) The Internet sites and some white papers that published from famous organizations and governments

Then the research will use primary resources divided into parts:

The First part is employing a questionnaire to conduct an empirical investigation through testing the factors of the TOE framework, which this framework considered to be standard to adopt new technology and involve the ICT managers and who is relevant, hence they face the coming danger and be aware of cloud computing technology. Afterward, the questionnaire aims at defining the barriers prevents them from transforming to cloud computing and implementing the optimal framework.

The second part of primary resources is practice review to the proposed questionnaire with the ICT managers, to come back with the final feedback on the first part to utilize it in their formations and enrich the survey with their expertise which applied to our case study and geographical location. The data collection will depend on a survey that the researcher developed from two main frameworks TOE and DOI as mentioned before.

3.4 Study Population and Sample

The population of the research consists of Ministry of Telecommunication and Information Technology employees of IT and management.

The population is 85 employees and I deliver the survey to all employees from both IT and management. Also, some collaborative IT companies will help us in improving our questionnaire, moreover concentrating on the critical and important factors that highly related to the study including reviewing the questionnaire and give feedback about the survey. The analysis process started after data collection. Statistical calculations and analysis will be used to handle quantitative data.

3.5 Study analysis

In order to analyze the quantitative data of the research, the questionnaire is used as the main research tool for collecting primary data. The factors of the questionnaire will be derived from both standards TOE and DOI frameworks determinants and will be measured through that survey and become with the results. Then analyze the results through SPSS statistical software.

3.6 Research Hypotheses

The research hypotheses that are created for each construct to speculate upon the outcome of the experiment. Each hypothesis statement will describe in concrete terms what the researcher expect to happen in the study. Then hypothesis for each construct is presented in the questionnaire design and they are:

H1: There is a statistically significant positive relation between relative advantage and the adoption of Cloud Computing (at the level of significance α= 0.05).

H2: There is a statistically significant positive relation between compatibility and the adoption of Cloud Computing (at the level of significance α= 0.05).

H3: There is a statistically significant positive relation between security and the adoption of Cloud Computing (at the level of significance α= 0.05).

H4: There is a statistically significant positive relation between cost and the adoption of Cloud Computing (at the level of significance α= 0.05).

H5: There is a statistically significant positive relation between Regulatory Support and the adoption of Cloud Computing (at the level of significance α= 0.05).

H6: There is a statistically significant positive relation between top management support and the adoption of Cloud Computing (at the level of significance α= 0.05).

H7: There is a statistically significant positive relation between competitive pressure and the adoption of Cloud Computing (at the level of significance α= 0.05).

H8: There is a statistically significant negative relation between Complexity and the adoption of Cloud Computing (at the level of significance α= 0.05).

H9: There is a statistically significant negative relation between Trialability and the adoption of Cloud Computing (at the level of significance α= 0.05).

H10: There is a statistically significant negative relation between Organizational Readiness and the adoption of Cloud Computing (at the level of significance α= 0.05).

H11: There is a statistically significant positive relation between External ICT Support and the adoption of Cloud Computing (at the level of significance α= 0.05).

H12: There is a statistically significant positive relation between Cloud knowledge and the adoption of Cloud Computing (at the level of significance α= 0.05).

H13: There is a statistically significant positive relation between Level of Innovativeness and the adoption of Cloud Computing (at the level of significance α= 0.05).

3.7 Expected output

The expected output would help the ICT sector that is related to our case study, in order to create a modified framework that helps the ICT managers to follow, leading to better and optimal performance. Also, would help in migration to cloud computing to adopt the transition planning for it and being updated. Lastly, broadcast out the culture of cloud computing among the local organizations to launch a modern residential district is coincidental to the rest of organizations in the worldwide that similar to our situation.

3.8 Research Procedure

The procedure of the research will be as follows:

- First, characterize the main fields of the questionnaire and its factors for each field, after that prepare an introductory questionnaire for use in the data and collection of information.
- Secondly, show and distribute the questionnaire to the IT experts (Software Engineer, Services Director, System Engineer and senior data center) and two Ph.D. academic teachers, and take into account their opinions and modify it.
- Thirdly, prepare the final form of the questionnaire due to the notes from both referees the supervisor and the IT experts.
- Fourthly, obtain the formal book from An-Najah National University to be authorized by the University to distribute the questionnaire easily and smoothly, and apply the research on the research population.
- After that, distribute the questionnaire among the employees in limited time, and retrieve it after they answer it. The distribution will be via electronic means (website) or by hand according to the availability of the employee.
- Finally, enter the data that retrieved from the respondents and fill it out in the SPSS statistical software to analyze their data statistically and get results.

3.9 Questionnaire Development and Design

The prepared questionnaire proposed to capture respondents' point of view about cloud computing adoption and its determinants that may influence the adoption process in the facility. The first draft of the survey consisted of 47 items. The main aim from these items was to measure the models of the research constructs. Each construct requires at least one item to measure it. (Moore & Banbasat, 1991) . The constructs help me to build my framework through examine research basis, considering the key variables in my research, and focusing on specific variables so facilitates the understanding of concepts and variables. The items were designed based on five-point Likert-type scale. It is considered one of the most common formats used in questionnaires. The scales with more than 7 points usually are confusing (Allen & Seaman, 2007). (Dawes, 2008) odd scale (5, 7, 9) gives the opportunity for participants to select neutral answer while even scales (4-6-8) would irritate participants by forcing them to be at one side or the other (positive or negative). In this research the majority of the items that are used in the survey were adapted from previously published journal articles, which have been validated in a different perspective, each determinant 'construct' has its own items in particular table as shown below.

As mentioned before, a quantitative method (a questionnaire) was created, in order to study the proposed research model. Most of the studies that are related to the adoption of cloud computing and adoption of new technology in the previous researches were reviewed, to confirm that a comprehensive list of items is included in the survey. Furthermore, the structured survey was

established from existing instruments to avoid difficulties of validity and reliability of the measures. So that, each factor is adopted from previous research within the area of TOE framework and DOI theory that used these determinants.

So according to the research objectives the survey was prepared, which consist of two main groups: group A and B. the first group (A) contains demographic information related respondent, and the second group (B) is structured to 9 different classifications.

The researcher designed the group B of the questionnaire in 14 main categories, and they are relative advantage, compatibility, competitive pressure, regulatory support, security concerns, cost savings, Regulatory Support, cloud computing adoption, complexity, trail ability, cloud knowledge, external ICT support and top manager support.

3.10 Hypothesis in research methodology

The first factor is a relative advantage which means the degree of superiority and attractiveness to customers over similar existing products, which provides the effect of this determinant by using 7 items scales and each item is measured using a Likert scale with 5-point ranging from 1(strongly agree) to 5 (strongly disagree). Table 3.1 contains the items and the adapted source. Therefore, the first hypothesis is:

H1: There is a statistically significant positive relation between relative advantage and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.1: Relative Advantage Measurement Items

Item	Adapted Source
RA1 - Cloud Computing allows you to manage business operations in an efficient way. **RA2** - The use of Cloud Computing services improves the quality of operations. **RA3** - Using Cloud Computing allows you to perform specific tasks more quickly. **RA4** - Using Cloud Computing allows you to increase business productivity. **RA5** - Cloud computing allows us to use the latest version of the technology **RA6** - Cloud computing would enhance our company's data storage capacity	(Ghobakhloo et al., 2011); (Ifinedo, 2011); (Moore & Banbasat, 1991); (Chau & Hui, 2001)

Second, compatibility concerns which include measuring the result from this item by five item scales, and each item is measured by a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Table 3.2 contains the items for measuring and the adapted source.

Therefore, the second hypothesis is:

H2: There is a statistically significant positive relation between compatibility and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.2: Compatibility Measurement Items

Item	Adapted Source
Comp1 - The use of Cloud Computing fits the work style of the company. **Comp 2** - The use of Cloud Computing is fully compatible with current business operations. **Comp 3** - Using Cloud Computing is compatible with your company's corporate culture and value system. **Comp 4** - The use of Cloud Computing will be compatible with existing hardware and software in the company. **Comp 5 -** Cloud can easily be integrated into our existing IT infrastructure	(Alam, 2009); (Bose & Luo, 2011); (Ifinedo, 2011); (Moore & Banbasat, 1991); (Thiesse et al., 2011); (Zhu et al., 2006)

The third section is security construct, which measuring the security by 4-item scales, and items measured by 5-point Likert scales ranging from 1 (strongly agree) to 5 (strongly disagree).

Table 3.3 contains the items for assessing with their indications and the adapted source.

The Fourth construct is cost saving section which supports the assessing of the effect of cost saving by using three-item scales and each item is measured by a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Table 3.4 shows the items and their indications for measuring quality.

Therefore, third, the hypothesis is:

H3: There is a statistically significant positive relation between security and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.3: Concerns of Security Measurement Items

Items	Adapted Source
Sec 1 - Degree of company's concern with data security on the Cloud Computing **Sec 2** - Degree of concern for customers with data security in Cloud Computing **Sec 3** - Degree of concern about privacy in Cloud Computing **Sec 4** - Cloud providers' servers and data centers are secure	(Luo, Gurung, & Shim, 2010); (Wu, 2011) (Zhu, Dong, Xu, & Kraemer, 2006)

Therefore, fourth the hypothesis is:

H4: There is a statistically significant positive relation between cost and the adoption of Cloud Computing (at the level of significance α= 0.05).

Table 3.4: Cost Saving Measurement Items

Items	Adapted
CS1 - The benefits of Cloud Computing are greater than the costs of this adoption. **CS2** - With Cloud Computing there is a reduction of energy costs and environmental costs. **CS3** - Maintenance costs of Cloud Computing are very low	(Sangle, 2011); (Thiesse et al., 2011) (Chau & Hui, 2001)

Fifth, Regulatory Support section, which provides the effect of this determinant by using 2-item scales, and each item is measured by a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Table 3.5 shows included items for measuring usability construct.

Therefore, fifth the hypothesis is:

H5: There is a statistically significant positive relation between Organizational Readiness and the adoption of Cloud Computing (at the level of significance α= 0.05).

Table 3.5: Organizational Readiness Measurement Items

Items	Adapted Source
OR1 - The company knows how IT can be used to support operations. **OR2** - There are within the company the necessary skills to implement Cloud Computing.	(Ifinedo, 2011)

Sixth, top management support construct, includes assessing top management support by 3- items scales and items are measured by 5-point Likert scales ranging from 1 (strongly agree) to 5 (strongly disagree). Table 3.6 shows included items with their indications for measuring user's knowledge construct.

Therefore, sixth the hypothesis is:

H6: There is a statistically significant positive relation between top management support and the adoption of Cloud Computing (at the level of significance α= 0.05).

Table 3.6: Top Management Support Measurement Items

Items	Adapted Source
TMS1 - The company's management supports the implementation of Cloud Computing. **TMS2** - The company's top management provides strong leadership and engages in the process when it comes to information systems company. **TMS3** - The company management is willing to take risks (financial and organizational) involved in the adoption of Cloud Computing.	(Alam, 2009); (Chwelos, et al., 2001); (Zhu, et al., 2010)

Seventh, competitive pressure section, which provides the effect of this determinant by using 3-item scales and each item is measured by a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Table

3.7 shows included items and their indications for measuring disposition to trust.

Therefore, seventh the hypothesis is:

H7: There is a statistically significant positive relation between competitive pressure and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.7: Competitive Pressure Measurement Items

Items	**Adapted Source**
CP1 - Organizations think that Cloud Computing has an influence on competition in their industry. **CP2** - Our organization is under pressure from competitors to adopt Cloud Computing. **CP3** - Some of our competitors have already started using Cloud Computing.	(Ifinedo, 2011); (Oliveira & Martins, 2011) (Thong & Yap, 1995)

Eighth, regulatory support section which supports assessing the effect of regulatory support by 2-item scales, and each item is measured by a 5-point Likert scale ranging from 1(strongly agree) to 5 (strongly disagree). Table 3.8 shows included items for measuring trust construct.

Therefore, eight the hypothesis is:

H8: There is a statistically significant positive relation between regulatory support and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.8: Regulatory Support Measurement Items

Items	Adapted Source
RS1 - There is legal protection in the use of Cloud Computing **RS2** - The laws and regulations that exist nowadays are sufficient to protect the use of Cloud Computing.	(Alam, 2009); (Kraemer & Zhu, 2005)

Ninth, cloud computing adoption section, includes assessing cloud computing adoption by 2-items scales and items measured by 5-point Likert scales ranging from 1 to 5. Table 3.9 shows included items with their indications for measuring adoption construct.

Table 3.9: Cloud Computing Adoption Measurement Items

Items	Adapted Source
CCA1 - The organization is currently engaged with Cloud Computing adoption **CCA**2 - I recommend the organization to evaluate Cloud Computing adoption but do not plan to adopt this technology **CCA**3 - I recommend the organization to adopt services, infrastructure or platforms of Cloud Computing.	(Thiesse, Staake, Schmitt, & Fleisch, 2011)

If you're anticipating that your company will adopt Cloud Computing in the future, and your organization has not already adopted Cloud Computing.

Tenth, Complexity section, includes assessing by 2-items scales and items measured by 5-point Likert scales ranging from 1 to 5. Table 3.10 shows included items with their indications for measuring adoption construct.

Therefore, a tenth the hypothesis is:

H9: There is a statistically significant negative relation between Complexity and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.10: Complexity Measurement Items

Items	Adapted Source
CMPLX1 - Working with cloud computing is complicated **CMPLX2 -** It takes too long to learn how to use the cloud computing **CMPLX3 -** In general cloud computing is very complex to use	(Moore & Banbasat, 1991)

Eleventh includes assessing Trail-ability section, by 2-items scales and items measured by 5-point Likert scales ranging from 1 to 5. Table 3.10 shows included items with their indications for measuring adoption construct. Therefore, Eleventh the hypothesis is:

H10: There is a statistically significant positive relation between Trail-ability and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.11: Trail-ability Measurement Items

Items	Adapted
TRL1 - I have a great deal of opportunity to try various types of cloud computing **TRL2 -** Cloud computing is available to me to adequately test run various applications Before deciding whether to use any cloud computing service, **TRL3 -** I would able to properly try them out **TRL4 -** I am permitted to use cloud computing on a trial basis long enough to see what it could do **TRL5 -** I am permitted to use cloud computing on a trial basis long enough to see what it could do	(Moore & Banbasat, 1991)

Twelfth includes assessing External ICT Support section, by 2-items scales and items measured by 5-point Likert scales ranging from 1 to 5. Table 3.10

shows included items with their indications for measuring adoption construct.

Therefore, thirteenth the hypothesis is:

H12: There is a statistically significant positive relation between External ICT Support and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.12: External ICT Support Measurement Items

Items	**Adapted**
EXTIS1 - For our company, receiving an excellent technical support from cloud provider is **EXTIS2 -** For our company receiving an exceptional customer service is **EXTIS3 -** For our company, offering customer hot-lines by cloud providers is **EXTIS4 -** It is important for our company to receive training from cloud providers:	(Chau & Hui, 2001)

Thirteenth includes assessing Cloud knowledge section, by 2-items scales and items measured by 5-point Likert scales ranging from 1 to 5. Table 3.10 shows included items with their indications for measuring adoption construct.

Therefore, fourteenth the hypothesis is:

H13: There is a statistically significant positive relation between Cloud knowledge and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.13: Cloud knowledge Measurement Items

Items	Adapted
CK1 - I have the knowledge about cloud computing **CK2 -** I have the knowledge about the benefits of using cloud computing **CK3 -** I know about different types of cloud (public, private and hybrid cloud) **CK4 -** I have the knowledge about the underlying structure of cloud computing	(Thong J. Y., 1999)

Fourteenth includes assessing Level of Innovativeness section, by 2-items scales and items measured by 5-point Likert scales ranging from 1 to 5. Table 3.10 shows included items with their indications for measuring adoption construct.

Therefore, fifteenth the hypothesis is:

H14: There is a statistically significant positive relation between Level of Innovativeness and the adoption of Cloud Computing (at the level of significance $\alpha = 0.05$).

Table 3.14: Level of Innovativeness Measurement Items

Items	Adapted Source
LINv1 - I am a kind of person who usually comes up with new ideas **LINv2 -** I would rather create something new than improve something existing **LINv3 -** I often take risk doing things differently	(Thong & Yap, 1995)

3.11 Questionnaire items validation

In order to ensure the content validity and more understandable for respondents of the questionnaire items, the questions were reviewed by a

panel of experts to check the clarity and evaluate the validity of the content. It was first reviewed by 2 Ph.D. professors from engineering management department at An-Najah National University, Software Engineer at EXALT Technologies, Services Director at Telnet Professional Services, System Engineer at Palestinian Ministry of Health, and Senior datacenter administrator at plate. Based on their experience and knowledge, some of the items were deleted, some modified, some were added to the questionnaire, and the rest of the items stayed as they are. So the new version of the questionnaire was sent to the supervisor and he approved it.

3.12 Set up the questionnaire

The data collection was collected using two ways: the first one was by giving the participant's hard copy from the questionnaire by hand, the second way was by launching an online copy using google forms to design and developing the questionnaire. Google forms is a free tool and considered one of the most commonly used online questionnaire software in an academic environment. The reason to use those two ways soft and hard copy is ensuring the maximum number of employees to participate in filling the questionnaire. Each item was trying to measure an aspect of this study. The final version of the questionnaire resides in appendix 2. Also in appendix 3, there is a table how every expert from the panel of experts approves every item; if the item approval ability was equal or less 60% of number experts, the item either changed or removed.

3.13 Running a Pilot test

First of all, a pilot study was conducted to check the reliability of my questionnaire. The pilot study was conducted on 10 employees; the respondents were selected randomly from our population. These 10 respondents were given the questionnaire by hand. The findings of the pilot study were measuring mainly the Cronbach's Alpha and it was equal to 90.9% which indicates a high level of internal consistency for our scale.

Cronbach's alpha is a measure of internal consistency of the questionnaire, also based on (Kline, 1999) indicate that when alpha is greater than 0.7 is acceptable.

3.14 Distribution of the Questionnaire

The questionnaire was distributed to all MTIT employees which equal to 85, employees and the researcher distribute 10 questionnaires to the pilot study, so in this case will remain 75 to distribute. The researcher distributes 18 electronic questionnaires and the rest hardcopy. The collected questionnaire from both electronic and hardcopy equals to 69 out of 75 responses.

3.15 Reliability Test

The reliability of each construct was computed by using Cronbach's alpha test. As mentioned above if the Cronbach's alpha is greater than 0.7, it means that the item has high reliability (Cronbach, 1951).

Table 3.15: Cronbach's alpha for research variables

Cronbach's alpha	Internal consistency
α >= 0.9	Excellent (High-Stakes testing)
0.8 <= α < 0.9	Good (Low-Stakes testing) Acceptable (Surveys) Questionable Poor Unacceptable
0.7 <= α < 0.8	
0.6 <= α 0.7	
0.5 <= α 0.6	
α < 0.5	

The table below shows the results from SPSS software, and as we can see all results are more than 0.70 and all variables are acceptable.

Cronbach's alpha Results

Table 3.15: Cronbach's alpha for each construct

Construct	Cronbach's alpha
Relative advantage	0.868
Compatibility	0.822
Security Concerns	0.798
Cost Savings	0.735
Knowledge	0.880
Top Manager Support	0.836
Competitive Pressure	0.815
Regulatory Support	0.879
Cloud Computing Adoption	0.702
Complexity	0.892
Trialability	0.712
Organization Readiness	0.789
Innovation Level	0.803
External Support	0.763

3.16 Chapter summary

In this chapter, the researcher explains the research methodology, research design, data resources, procedure, data processing, research population and research sample. In addition, discusses research tool, reliability, and validity. Furthermore, it addresses the ethical considerations of the research and research procedure.

Chapter Four

Data Analysis and Results

Chapter Four

Data Analysis and Results

4.1 Overview

This chapter presents the results of analysis of the data collected via questionnaire. It represents the results of descriptive statistics and hypotheses testing derived from the Statistical Package for the Social Sciences (SPSS) software, by which this study determined the factors affecting the adoption of Cloud Computing in Palestinian Ministry of Telecommunication and Information Technology according to the proposed framework.

4.2 Descriptive Analysis

By reference to Chapter 3; the questionnaire design, participants have different demographic information; these differences introduce different responses toward the factors that influence the adoption of Cloud Computing in MTIT. The following results show these differences.

4.2.1 Demographic Information

The total number of participants from twelve universities in Palestine is 69 respondents, with response rate 92%. The following tables present the characteristics of the participants.

4.2.2 Gender

Table (4.1) shows that most of the responders are males with (62.3%) of the population and (37.7%) of the sample are females.

Table (4.1): Respondents' Gender representation

	Frequency	Percent
Male	43	62.3
Female	26	37.7

4.2.3 Qualification

Educational level was divided into three standards. Table (4.2) shows that most of the respondents have a Bachelor degree (68.1%), and (23.2%) have a higher Educational degree while (8.7%) have a diploma or less which means that all respondents are educated and the most of them have at least a Bachelor degree

Table (4.2): Respondents' Qualification representation

	Frequency	Percent
Diploma	6	8.7
Bachelor	47	68.1
Graduate Studies	16	23.2
Total	69	100.0

4.2.4 Age

Table (4.3) shows that most of the respondents are between (30) and (40) years (46.4%), (31.9%) of the respondents are 30 years old or less, (11.6%) of the population are between (40) and (50), and (10.1%) of the population are more than 50 years which means that most of the respondents are youth.

Table (4.3): Respondents' Age representation

	Frequency	Percent
30 years or less	22	31.9
31 - 40 years	32	46.4
41 - 50 years	8	11.6
More than 50 years	7	10.1
Total	69	100.0

4.2.5 Specialty

Table (4.4) shows that more than half of the respondents have a specialty in Information Technology (IT) as (14.1%), and engineers as (36.2%), Management specialty as (26.1%), while the last respondents are the other specialties as (23.2%). This indicates that the sample covers the targeted population of the study, by the top percentages is the ICT engineers and management employees.

Table (4.4): Respondents' Specialty representation

Major	Frequency	Percent
Management	18	26.1
Engineer	25	36.2
IT	10	14.5
other	16	23.2
Total	69	100.0

4.2.6 Experience Year

Table (4.5) shows that the respondents include all the varied experiences; there are (17.7%) of the respondents who have 2-5 years of experience while (31.9%) have 5-10 years of experience, (46.4%) have more than 10 years of experience while the last respondents have 2 years of experience or less as (4.3%). This means that the respondents have a good experience in their

working field, and were able to give value perceptions enriching the research.

Table (4.5): Respondents' Experience representation

	Frequency	Percent
<2	3	4.3
2-5	12	17.4
5-10	22	31.9
>10	32	46.4
Total	69	100.0

4.2.7 Position Title

Table (4.6) shows that the respondents are from different positions of ICT departments; there are (5.8%) of respondents are network admin/engineer, (8.7%) of the respondents are telecommunication engineer, (4.3%) of the respondents are IT manager, (7.2%) of the respondents are system admin/engineer, (40.6%) of the respondents are managers, (21.7%) of the respondents are Management Employee, and 11.5% other positions.

Table (4.6): Respondents' Position Title representation

	Frequency	Percent
Manager	28	40.6
IT Manager	3	4.3
System Engineer	5	7.2
Network Engineer	4	5.8
Management Employee	15	21.7
Telecommunication Engineer	6	8.7
other	7	11.5
Total	69	100.0

4.3 Descriptive Statistics Among Survey Respondents

To illustrate the statistical differences among participants in this research, the researcher used Linear Regression and One-Way ANOVA Test; these two tests are used in order to see whether that the distribution set of values observed for each category of variables differs from a specified distribution. According to Yan and Su (2009), the linear regression is the relationship between a scalar dependent variable and one or more explanatory variables (or independent variables). But One-Way ANOVA compares means of independent variable which could be divided into three or more distinct levels (Saunders et al., 2009)

4.3.1 Statistical Differences According to Gender

Both males and females were surveyed in this study; so the researcher used t-test method to explore the statistical differences between males and females. The Table 4.7 and Table 4.8, shows that there are no statistical differences between males and females in recognizing all of the factors where (P-value > 0.05) for all.

Table (4.7) Descriptive Statistics among Participants according to Gender

Gender		N	Mean	Std. Deviation	Std. Error Mean
Relative Advantage	Male	43	4.1085	.48507	.07397
	Female	26	4.0577	.53943	.10579
Compatibility	Male	43	3.6651	.59637	.09095
	Female	26	3.5077	.61249	.12012
Security	Male	43	3.5640	.66836	.10192
	Female	26	3.5096	.78575	.15410
Cost	Male	43	3.8295	.62307	.09502
	Female	26	3.6795	.59240	.11618
Knowledge	Male	43	3.4477	.74912	.11424
	Female	26	3.2596	.75657	.14838
Top Management Support	Male	43	3.3101	.79147	.12070
	Female	26	3.2051	.80596	.15806
Competitive Advantage	Male	43	3.2946	.66750	.10179
	Female	26	3.1923	.68100	.13356
Regulatory Support	Male	43	2.8256	.99931	.15239
	Female	26	3.1154	.85215	.16712
Adoption	Male	43	3.3767	.61908	.09441
	Female	26	3.3231	.58262	.11426
Complexity	Male	43	2.6202	.86856	.13245
	Female	26	2.6795	.84053	.16484
Trialability	Male	43	3.3721	.68317	.10418
	Female	26	3.5641	.63083	.12372
Organization Readiness	Male	43	3.4070	.81105	.12368
	Female	26	3.3654	.83136	.16304
Innovation Level	Male	43	3.5581	.77910	.11881
	Female	26	3.6667	.88443	.17345
External Support	Male	43	3.2907	.59244	.09035
	Female	26	3.2692	.78716	.15437

Table (4.8) Independent Samples Test for Gender Differences among Participants

Independent Samples Test							
	t-test for Equality of Means						
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Relative Advantage	.404	67	.687	.05083	.12571	-.20009	.30176
Compatibility	1.052	67	.297	.15742	.14966	-.14130	.45615
Security	.306	67	.760	.05434	.17748	-.29992	.40860
Cost	.987	67	.327	.14997	.15199	-.15340	.45334
Knowledge	1.007	67	.318	.18806	.18680	-.18479	.56091
Top Management Support	.530	67	.598	.10495	.19798	-.29021	.50011
Competitive Advantage	.612	67	.543	.10227	.16709	-.23124	.43577
Regulatory Support	-1.232	67	.222	-.28980	.23528	-.75943	.17982
Adoption	.357	67	.722	.05367	.15048	-.24669	.35403
Complexity	-.278	67	.782	-.05933	.21320	-.48489	.36623
Trialability	-1.164	67	.249	-.19201	.16499	-.52133	.13731
Organization Readiness	.204	67	.839	.04159	.20339	-.36437	.44755
Innovation Level	-.533	67	.596	-.10853	.20371	-.51513	.29808
External Support	.129	67	.898	.02147	.16688	-.31162	.35456

4.3.2 Statistical Differences According to Qualification

This research includes participants who their education level is divided into three groups: diploma degree, bachelor degree, and Graduate studies. The researcher used One Way ANOVA method to explore the statistical differences between the three levels of the Qualification variable, the researcher used One Way ANOVA to see whether that the distribution set of values observed for each category of a variables differs from a specified

distribution and compares means of independent variable which could be divided into three or more distinct groups or levels (Saunders et al., 2009).

Relative Advantage, Compatibility, Security, Cost, Knowledge, Top Management Support, Competitive Advantage, Adoption, Complexity, Trialability, Organization Readiness, Innovation Level, and External Support; there are no statistical differences between participants according to Qualification (P> 0.05).

But Regulatory Support there are statistical differences between participants according to Qualification (P=0.032< 0.05).

The mean of Qualification is 2.14

Table 4.9 (in Appendix C) and Table 4-10 show full details about these statistical differences.

Table (4.10) ANOVA test for Qualification

ANOVA		
	F	Sig.
Relative Advantage	2.978	.058
Compatibility	.387	.680
Security	.397	.674
Cost	.119	.888
Knowledge	.830	.440
Top Management Support	.935	.398
Competitive Advantage	.144	.866
Regulatory Support	3.639	.032
Adoption	1.546	.221
Complexity	.310	.734
Trialability	.664	.518
Organization Readiness	.108	.898
Innovation Level	.962	.387
External Support	.006	.994

Then the researcher used LSD (which considered a type of Post-hoc test) test to detect the significance of each factor with Qualification descriptive determinant in table 4.11, to find which specific group is different from other.

Table 4.11 LSD test with Qualification descriptive determinant.

Dependent Variable: Organizational Support						
LSD						
(I) Qualification	(J) Qualification	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Diploma	Bachelor	.91844*	.39702	.024	.1258	1.7111
	GraduateStudies	1.17708*	.43840	.009	.3018	2.0524
Bachelor	Diploma	-.91844*	.39702	.024	-1.7111	-.1258
	GraduateStudies	.25864	.26507	.333	-.2706	.7879
GraduateStudies	Diploma	-1.17708*	.43840	.009	-2.0524	-.3018
	Bachelor	-.25864	.26507	.333	-.7879	.2706
*. The mean difference is significant at the 0.05 level.						

As we can see from the table (4.11), the researcher used LSD to detect where exactly the mean differences lie, and the test shows a significant difference between participants that have diploma degree and bachelor degree, and those who have diploma degree and Graduate Studies degree, which illustrate that participants who have diploma degree have better understand for the adoption of cloud computing, due to cloud computing meets the growing demand from IT and wish to gain a deeper understanding of concept and application of Cloud Computing.

4.3.3 Statistical Differences According to Age

This research includes participants who their age is divided into four groups: less 30 years, 30 - 40 years, 40 - 50 years, More than 50 years. The researcher used One Way ANOVA method to explore the statistical differences between the four levels of the age variable. Relative Advantage, Compatibility, Security, Cost, Knowledge, Top Management Support, Competitive Advantage, Adoption, Complexity, Trialability, Regulatory Support, Organization Readiness, Innovation Level, and External Support; there are no statistical differences between participants according to Qualification (P> 0.05).

The mean of age is 2.0

Table 4.12 (in Appendix C) and Table 4-13 show full details about these statistical differences.

Table (4.13) ANOVA test for Age

ANOVA		
	F	Sig.
Relative Advantage	1.619	.193
Compatibility	.524	.668
Security	.833	.480
Cost	.647	.588
Knowledge	1.706	.174
Top Management Support	.147	.931
Competitive Advantage	.661	.579
Regulatory Support	.437	.727
Adoption	1.328	.273
Complexity	1.143	.339
Trialability	1.964	.128
Organization Readiness	.121	.947
Innovation Level	.467	.706
External Support	.385	.764

4.3.4 Statistical Differences According to Specialty

This research includes participants who their Specialty is divided into four groups: management, engineer, IT, and other Specialties. The researcher used One Way ANOVA method to explore the statistical differences between the four levels of the age variable. Relative Advantage, Security, Knowledge, Adoption, Complexity, Trialability, Regulatory Support, Organization Readiness, Innovation Level, and; there are no statistical differences between participants according to Qualification (P> 0.05).

But Compatibility, Cost, Top Management Support, Competitive Advantage, and External Support there are statistical differences between participants according to specialty (P< 0.05).

The mean of age is 2.35

Table 4-14 (in Appendix C) and Table 4-15 show full details about these statistical differences.

Table (4.15) ANOVA test for Specialty

ANOVA		
	F	Sig.
Relative Advantage	1.403	.250
Compatibility	3.554	.019*
Security	2.646	.056
Cost	3.454	.021*
Knowledge	1.556	.209
Top Management Support	3.024	.036*
Competitive Advantage	3.656	.017*
Regulatory Support	.654	.583
Adoption	1.895	.139
Complexity	2.401	.076
Trialability	2.030	.118
Organization Readiness	1.315	.277
Innovation Level	.202	.895
External Support	2.896	.042

Then the researcher used LSD test to detect the significance of each factor with Qualification descriptive determinant in table 4-16 (in Appendix C).

Compatibility Factor LSD Analysis:

As we can see from the table(4.15), LSD test shows a significant differences between participants that their specialty is management , engineer, IT, and other ,with the factor compatibility, which illustrate that participants who specialty is management, engineer, and other are care more about compatibility for the adoption of cloud computing than IT people, due to these specialties interested in service strategy that can be applied to deal with that inter-client conflict that comes with the diversity , share the same servicescape and to handle the proximity and heterogeneity of consumers during these interactions.

Security Factor LSD Analysis:

As we can see from the table (4.15), LSD test shows a significant difference between participants that their specialty is management, engineer, IT, and other, with the factor security, which illustrate that participants who specialty is management, engineer, and other are care more about security concerns for the adoption of cloud computing than IT people, the reason is that the IT staff may bring a security solution that complies with the new environment and solve their problem.

Cost Factor LSD Analysis:

As we can see from the table (4.15), LSD test shows a significant difference between participants that their specialty is management, engineer, and other,

with the factor cost, which illustrate that participants who specialty is management and engineer care more than the ‘other’ specialty, about how it will cost and how they will manage the whole process including the costing determinant.

Top Management Support Factor LSD Analysis:

As we can see from the table (4.15), LSD test shows a significant difference between participants that their specialty is IT and other, with the factor Top management support, which illustrates that participants who specialty other are higher influenced than IT employees, so that for IT professional’s incident management for cloud to handle outages, service problems and some technical issues with the top management.

Competitive Advantage Factor LSD Analysis:

As we can see from the table (4.15), LSD test shows a significant difference between participants who’s their specialty is management and IT, and those who are engineers, and differences between who’s their specialty other and IT with the factor competitive advantage, which illustrate that that their point of view that cloud can offer incredible flexibility, allowing you to rapidly adapt your systems to support business circumstances and full job visibility and effortless collaboration.

External Support Factor LSD Analysis:

As we can see from the table (4.15), LSD test shows a significant difference between participants who’s their specialty is engineer and other, and those who are IT, with the factor external support, so the engineers and another

specialty can have better understand the external support, so that they build the fundamentals to supporting their company's growth internally and externally.

4.3.5 Statistical Differences According to Experience Years

This research includes participants who their Experience years is divided into four groups: management, engineer, IT, and other Specialties. The researcher used One Way ANOVA method to explore the statistical differences between the four levels of the Experience year's variable. Relative Advantage, Security, Knowledge, Adoption, Complexity, Trialability, Regulatory Support, Organization Readiness, Innovation Level, Compatibility, Cost, Top Management Support, Competitive Advantage, and External Support; there are no statistical differences between participants according to Experience years (P> 0.05). The mean of age is 3.29

Table 4-17(in Appendix C) and Table 4-18 show full details about these statistical differences.

Table (4.18) ANOVA test for Experience years

ANOVA		
	F	Sig.
Relative Advantage	1.426	.243
Compatibility	.477	.699
Security	1.659	.185
Cost	.160	.923
Knowledge	.676	.570
Top Management Support	1.277	.290
Competitive Advantage	1.250	.299
Regulatory Support	1.874	.143
Adoption	.522	.668
Complexity	.335	.800
Trialability	1.817	.153
Organization Readiness	.275	.843
Innovation Level	.339	.797
External Support	1.866	.144

4.3.6 Statistical Differences According to Position

This research includes participants who their positions are divided into eight groups: Manager, IT Manager, System Engineer, Network Engineer, Management Employee, Database Admin, Telecommunication Engineer, and other positions. The researcher used One Way ANOVA method to explore the statistical differences between the eight levels of the position variable. Relative Advantage, Knowledge, Adoption, Complexity, Trialability, Regulatory Support, Organization Readiness, Innovation Level, Cost, Competitive Advantage, and External Support; there are no statistical differences between participants according to Experience years ($P > 0.05$).

But Compatibility, Security, and Top Management Support there are statistical differences between participants according to specialty (P< 0.05). The mean of position is 3.54. Table 4-19 (in Appendix C) and Table 4-20 show full details about these statistical differences.

Table (4.20) ANOVA test for Position

ANOVA		
	F	Sig.
Relative Advantage	.673	.694
Compatibility	2.331	.036
Security	3.142	.007
Cost	.701	.671
Knowledge	1.810	.102
Top Management Support	2.312	.037
Competitive Advantage	.806	.585
Regulatory Support	1.166	.336
Adoption	1.413	.217
Complexity	1.260	.285
Trialability	1.369	.235
Organization Readiness	1.942	.078
Innovation Level	1.372	.234
External Support	1.096	.377

Then the researcher used LSD test to detect the significance of each factor with Position descriptive determinant in table 4-21 (in Appendix C)

Compatibility Factor LSD Analysis:

As we can see from the table (4.20), LSD test shows a significant difference between participants that their position is manager and other, with the factor compatibility, which clarifies that participants whose position is manager

care more about compatibility for the adoption of cloud computing than ‘other’, due to that managers try their effort to move to the new technology especially it will make their tasks easier and reach it from everywhere instead of from the local office.

Security Factor LSD Analysis:

As we can see from the table (4.20), LSD test shows a significant differences between participants that their position IT manager and whose position is manager, system engineer, network engineer, management employee, and telecommunication engineer with the factor security, which illustrate that participants who specialty is IT manager care more about various information security concerns for the adoption of cloud computing , the reason is that with cloud services are typically handled through pre-, para- and post-employment activities such as security awareness, security screening potential recruits, and training programs.

Organization Readiness Factor LSD Analysis:

As we can see from the table (4.20), LSD test shows a significant differences between participants that their position IT manager and whose position is manager, system engineer, network engineer, management employee, and telecommunication engineer with the factor Organization Readiness, which clarify that the IT managers take the right decisions in both directions; in the technical and in the management departments, so that they will make the process to adopt this new technology more easily and more smoothly, furthermore the organization will be ready to move to cloud computing.

4.4 Hypotheses Testing

The researcher used in this study Linear Regression to test the research hypotheses. Linear regression analysis is to test the relationship between a scalar dependent variable and one or more explanatory variables (or independent variables) (Yan & Su, 2009).

The main framework TOE, contains each of them multiple factors categorized into three contexts as explained in literature chapter, and they are:

A. Environmental factors: Competitive Advantage and External Support
B. Technology factors: Security and Cost
C. Organizational factors: Top Management Support, Regulatory Support, and Organization Readiness

And the other framework; DOI framework, and its factors are Relative Advantage, Compatibility, Knowledge, Complexity, Trialability, and Innovation Level.

P-value: The P-value can be considered as a quantitative measure of the numerical importance of testing a hypothesis. Furthermore, regarding the studies conducted formerly, P-value < 0.05 implies the significance of the related hypothesis (Ifinedo, 2011)

Squared R (R2): The R2 shows the expected effect of the model of dependent variables through estimating the percentage of a construct's variance in the model (Ifinedo, 2011)

The two symbols used in the following analysis: the first one is (ρ) means Pearson Correlation, and (P) means P-value.

4.4.1 Results of Environmental Factors and its Relationship with Adoption

The results of linear regression analysis show Environmental Factors is jointly predicted by Competitive Advantage (ρ=0.622, T-value=3.594, P=0.001), External Support (ρ=0.632, T-value=3.822, P=0.00). The Environmental Factor explain 49.8% (R2=0. .498, where R2 represents the coefficient of determination for Environmental factors, the value shown in Table 4-8.

The hypothesis that is related to Environmental Factors is Competitive Advantage H7 and External Support H12.Since the P-Value is less than 0.05 of both H7 and H12, so they are both factors significant and they affect the cloud computing adoption.

The reason that these two factors, Competitive Advantage, and External Support are supported is that the MTIT compete with other organizations in the public sector to be the first one to use cloud computing, and it is already used the virtualization technology in its data centers. Moreover, the ministry gets external support from the private sector and other abroad ministries from other countries through the cooperation between Palestine and the advanced countries.

The Environmental Factor model is significant since the P-Value is less than 0.05

Table (4.22) Model Summary for Environmental Factors and its relationship with Adoption

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.706[a]	.498	.483	.43293	.498	32.704	2	66	.000
a. Predictors: (Constant), External Support, Competitive Advantage									
b. Dependent Variable: Adoption									

Table (4.23) ANOVA test for Environmental Factors and its relationship with Adoption

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.259	2	6.130	32.704	.000[b]
	Residual	12.370	66	.187		
	Total	24.630	68			
a. Dependent Variable: Adoption						
b. Predictors: (Constant), External Support, Competitive Advantage						

Table (4.24) Coefficients for Environmental Factors and its relationship with Adoption

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.018	.294		3.467	.001	.432	1.605
	Competitive Advantage	.346	.096	.385	3.594	.001	.154	.538
	External Support	.369	.097	.409	3.822	.000	.176	.562

4.4.2 Results of Technology Factors and its Relationship with Adoption

The results of linear regression analysis show that Technology Factors is jointly predicted by perceived Security (ρ=0.504, T-value=4.252, P=0.00), perceived cost (ρ=0.212, T-value=0.621, P=0.537). These factors explain 52.4% (R2=0.524), their values shown in Table 4-8.

The hypothesis that is related to Technology Factors is Security H3 and Cost H4. Since the P-Value is less than 0.05 of H3, so the factor is significant and it affects the cloud computing adoption, but the H4 the P-value equals 0.537 which is more than 0.05, so it is NOT significant.

The security factor is supported because of the ministry and its employees take in its consideration the safety and security of their data which implies the importance of the data and how it is sensitive. On the other hand, the cost was not supported, although the cloud computing saving the cost of hosting the physical servers and the expenses to buy them as the researcher discussed literature review chapter, but in the Palestinian case because it is new technology and not easily available to use from its providers, it will be costly.

The Technology Factor model is significant since the P-Value is less than 0.05.

Table (4.25) Model Summary for Technology Factors and its relationship with Adoption

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.508[a]	.258	.236	.52617	.258	11.482	2	66	.000
a. Predictors: (Constant), Cost, Security									
b. Dependent Variable: Adoption									

Table (4.26) ANOVA test for Technology Factors and its relationship with Adoption

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.357	2	3.179	11.482	.000[b]
	Residual	18.272	66	.277		
	Total	24.630	68			

a. Dependent Variable: Adoption

b. Predictors: (Constant), Cost, Security

Table (4.27) Coefficients for Technology Factors and its relationship with Adoption

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.648	.451		3.653	.001	.747	2.549
	Security	.410	.094	.483	4.353	.000	.222	.598
	Cost	.068	.109	.069	.621	.537	-.150	.286

4.4.3 Results of Organizational Factors and its Relationship with Adoption

The results of linear regression analysis show that Organizational Factors is jointly predicted by perceived Top Management Support (ρ=0.648, T-value=3.90 P=0.00), perceived Regulatory Support (ρ=0.627, T-value= 3. 596, P=0.001), and Organization Readiness (ρ=0.429, T-value=0.069, P=0.946). These factors explain 52.4% (R2=0. 524), their values shown in Table 4-8.

The hypothesis that is related to Organizational Factors is Top Management Support H6, Regulatory Support H5, and Organization Readiness H11.

Since the P-Value is less than 0.05 of both H5 and H6, so these two factors are significant and they affect the cloud computing adoption.

But H11 is Not Significant sine the P-value is more than 0.05.

The Top Management Support this new concept which will develop and enhance the security, present a supportive climate, and provide adequate resources for the adoption with high performance. Furthermore, this adoption will comply with its vision and mission to be a leader IT fields in Palestine.

The considerations about the legal issues, especially data store, process, and how these regulations sufficient to protect the data that will be used in cloud computing technology in the ministry.

The readiness in the organization is still in the first phases by building the infrastructure that will serve in the overall infrastructure and provide the new services, so H11is not the supported. The Organizational Factor model is significant since the P-Value is less than 0.05 Table (4.28)

Table (4.28) Model Summary for Organizational Factors and its relationship with Adoption

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.724[a]	.524	.502	.42489	.524	23.809	3	65	.000

a. Predictors: (Constant), Organization Readiness, Regulatory Support, Top Management Support

b. Dependent Variable: Adoption

Table (4.29) ANOVA test for Organizational Factors and its relationship with Adoption

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.895	3	4.298	23.809	.000[b]
	Residual	11.735	65	.181		
	Total	24.630	68			

a. Dependent Variable: Adoption
b. Predictors: (Constant), Organization Readiness, Regulatory Support, Top Management Support

Table (4.30) Coefficients for Organizational Factors and its relationship with Adoption

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.554	.250		6.222	.000	1.055	2.053
	Top Management Support	.327	.084	.430	3.900	.000	.159	.494
	Regulatory Support	.244	.068	.385	3.596	.001	.108	.379
	Organization Readiness	.005	.078	.007	.069	.946	-.151	.162

4.4.4 Results of DOI Factors and its Relationship with Adoption

The results of linear regression analysis show that DOI Factors is jointly predicted by perceived Relative Advantage (ρ=0.301, T-value=0.945, P=0.348), perceived Compatibility (ρ=0.502, T-value=2.098, P=0.04), Knowledge (ρ=0.003, T-value=-.081, P=0.935), perceived Complexity

(ρ=0.612, T-value=2.143, P=0.019), Trialability (ρ=0.421, T-value=2.143, P=0.036), and Innovation Level (ρ=0.351, T-value=1.816, P=0.74). These factors explain 42.3% (R2=0. 423), their values shown in Table 4-8.

The hypothesis that is related to DOI Factors is Relative Advantage H1, Compatibility H2, Knowledge H12, Complexity H8, Trialability H9, and Innovation Level H13. Since the P-Value is less than 0.05 of H2, H8, and H9, so they are significant and they affect the cloud computing adoption. But H1, H12, and H13 the P-value is more than 0.05 is NOT Significant.

The data center which available in MTIT contains heterogeneous systems which make the communication is complex, but it is not an issue according to the IT department in the ministry. The training is very supported and common to anything new in the ministry so that this new technology should take training courses to become familiar with it. The hybrid cloud nowadays makes the compatibility in the evolution of cloud computing easier to immigrate to the new technology and faster to control.

The knowledge and awareness of the benefits of cloud computing that is presented in the results above are not positive; this effect the relative advantage of cloud computing factor in a negative way. In other words, the probability of adopting process is lower for individuals who has lower knowledge about cloud computing. The innovation level is still not mature in the ministry's employees in taking the risk to explore and try new technologies like cloud computing and not creates something new than improving something existing system.

The DOI Factor model is significant since the P-Value is less than 0.05 table (4.31)

Table (4.31) Model Summary for DOI Factors and its relationship with Adoption

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.650[a]	.423	.367	.47871	.423	7.580	6	62	.000

a. Predictors: (Constant), Innovation Level, Relative Advantage, Complexity, Knowledge, Trialability, Compatibility
b. Dependent Variable: Adoption

Table (4.32) ANOVA test for DOI Factors and its relationship with Adoption

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.422	6	1.737	7.580	.000[b]
	Residual	14.208	62	.229		
	Total	24.630	68			

a. Dependent Variable: Adoption
b. Predictors: (Constant), Innovation Level, Relative Advantage, Complexity, Knowledge, Trialability, Compatibility

Table (4.33) Coefficients for DOI Factors and its relationship with Adoption

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.205	.597		.344	.732	-.988	1.398
	Relative Advantage	.134	.142	.112	.945	.348	-.149	.417
	Compatibility	.259	.124	.260	2.098	.040	.012	.506
	Knowledge	-.007	.081	-.008	-.081	.936	-.168	.155
	Complexity	.179	.074	.254	2.414	.019	.031	.328
	Trialability	.207	.097	.229	2.143	.036	.014	.401
	Innovation Level	.140	.077	.189	1.816	.074	-.014	.294

The following table (Table 4.31) shows the results of all factors and its relationship with adoption and its significance

Table (4.34) Results of all Factors and its relationship with Adoption and its Significance

	Factor	(ρ) Pearson Correlation	T-Value	P-Value (Significant)
1.	**Competitive Advantage**	.622	3.594	.001
2.	**External Support**	.632	3.822	.000
3.	**Relative Advantage**	.301	0.945	.348
4.	**Compatibility**	.502	2.098	.040
5.	**Knowledge**	.003	-0.081	.491
6.	**Complexity**	.612	2.144	.019
7.	**Trialability**	.421	2.143	.036
8.	**Innovation Level**	.351	1.816	.074
9.	**Security**	.504	4.252	.000
10.	**Cost**	.212	0.621	.537
11.	**Top Management Support**	.648	3.900	.001
12.	**Regulatory Support**	.627	3.596	.001
13.	**Organization Readiness**	.429	0.069	.946

Some of these factors are supported and significant and the others are not significant in addition, these factors are derived from TOE and DOI frameworks, and from previous empirical studies, results supporting all factors of TOE framework and almost all factors from DOI framework.

In figure 4.1 the conceptual framework that developed to MTIT case study and the supported determinants.

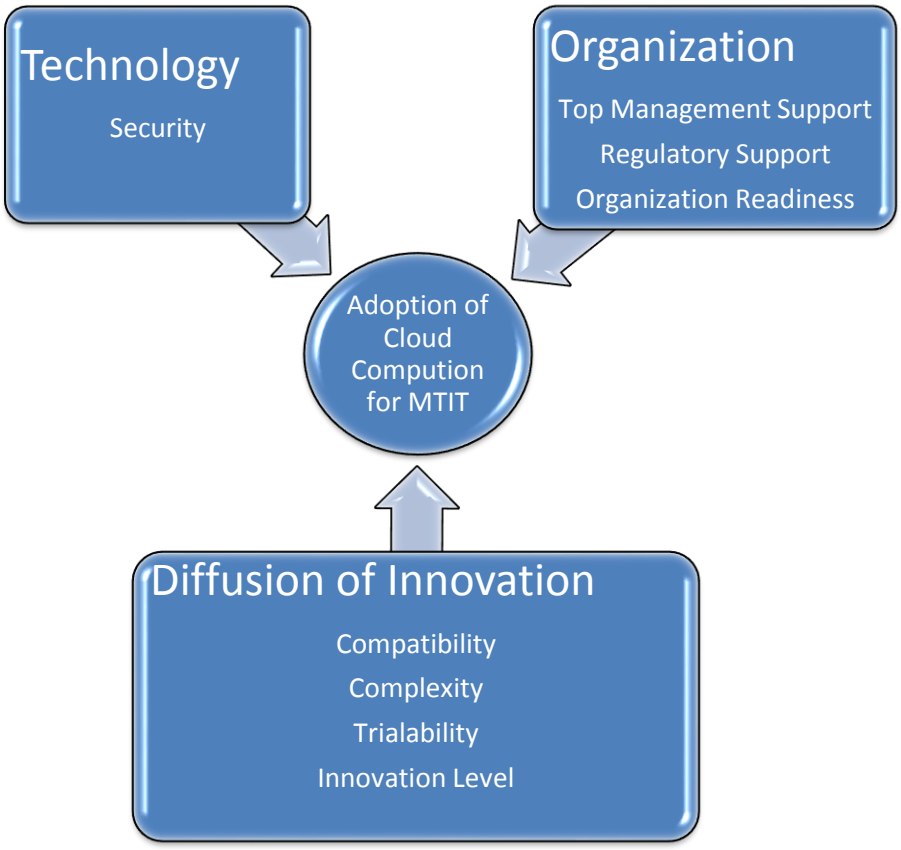

Figure 4.1 the conceptual framework for MTIT

Based on previous results, theories, and factors related to cloud computing adoption as a system specific, we have identified and integrated the most important factors that influence the adoption of cloud computing by Palestinian MTIT. The proposed framework (Figure 4.1), primarily consists of the factors of TOE framework integrated with DOI factors. With this

framework, the MTIT can now focus on the critical factors that are not supported, and strength and the weaknesses to address the main challenges facing the adoption of cloud computing.

Table 4.35 shows the final results for each hypothesis. Base on this result and relationship between coefficients, including T-value and P-value that explain in this section.

Table (4.35) Summaries of the Hypothesis Results

Hypothesis	T-Value	P-Value	Results
H1: Relative Advantage affect Adoption of Cloud Computing	0.945	.348	Not Support
H2: Compatibility affect Adoption of Cloud Computing	2.098	.040	Support
H3: Security Concerns affect Adoption of Cloud Computing	4.353	.000	Support
H4: Cost affect Adoption of Cloud Computing	0.621	.537	Not Support
H5: Regulatory Support Affect Adoption of Cloud Computing	3.596	.001	Support
H6: Top Management Support affect Adoption of Cloud Computing	3.596	.001	Support
H7: Competitive Pressure affect Adoption of Cloud Computing	3.594	.001	Support
H8: Complexity negatively affect Adoption of Cloud Computing	2.144	.019	Support
H9: Trialability affect Adoption of Cloud Computing	2.143	.036	Support
H10: Organizational Readiness Affect Adoption of Cloud Computing	0.069	.946	Not Support
H11: External ICT Support affect Adoption of Cloud Computing	3.822	.000	Support
H12: Cloud Knowledge affect Adoption of Cloud Computing	-0.081	.491	Not Support
H13: Level of innovativeness affect Adoption of Cloud Computing	1.816	.074	Not Support

4.5 Determinant Results

In order to determine the factors that considered to be the most significant coefficient of determination of cloud computing adoption in MTIT, Stepwise Regression technique was used. The finding shows that top management support, competitive advantage, and Trialability are the main factors that explain 57.4% of the variance on intention to adopt cloud computing. (Table 4.32, summarized this result)

Table (4.36)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.648[a]	.420	.411	.46194
2	.737[b]	.544	.530	.41258
3	.770[c]	.593	.574	.39259

a. Predictors: (Constant), Top Management Support
b. Predictors: (Constant), Top Management Support, Competitive Advantage
c. Predictors: (Constant), Top Management Support, Competitive Advantage, Trialability

4.6 Answers to research's Questions

From the research findings and analysis of the questionnaire, the only research' question can be answered, the research question is shown as below:

What are the potential factors that affect the adoption of cloud computing?

The factors are derived from both TOE and DOI frameworks:

Relative Advantage, Compatibility, Security, Cost, Knowledge, Top Management Support, Competitive Advantage, Regulatory Support,

Adoption, Complexity, Trialability, Organization Readiness, Innovation Level External Support.

These factors were used in this research to test how every factor can affect the adoption of cloud computing. The supported factors were: Compatibility, Security, Top Management Support, Regulatory Support, Complexity, Trialability, Organization Readiness, and Innovation Level. The rejected factors were: Relative Advantage, Cost, Competitive Advantage, External Support, and Knowledge.

4.7 Discussion

Discussion of how Palestinian MTIT will be affected by implementing cloud computing. The researcher discusses the affection in three areas: potential benefits, strategies, and organization management related to service quality.

- Discussion of The Potential Benefits of Implementing Cloud Computing Framework in MTIT in Palestine:

The cloud computing contains outsourcing of computing resources with expendable resource scalability, on-demand provisioning with minimal IT infrastructure costs. (Catteddu & Hogben, 2009). In addition, it interacts with the overall strategy to Increase rate of growth, given the authority to employees and make a marked change in the business (Cote et al., 2013).

Also allows organizations and users to turn a better IT support for their profitable activities and keep updated with novel technologies (Dimitrakos, 2010). Moreover, it transforms the resort from IT from a high-priced ‘capital

expenditure' to a pay-as-you-go 'operating expenditure' (Venters & Whitley, 2012).

Ease of Implementation, the organization can apply cloud computing quickly; no need to purchase hardware, software licenses. The Flexibility (Elasticity) can be considered as a major benefit of cloud computing, which can increase mobility by enabling access to business database and applications from different locations and devices. Furthermore, Scalability, so we do not worry about adding additional hardware and software when the client loads increase and access to high-caliber devices and software Capabilities of IT. Finally, Focus on Core Competencies, like operate data centers, the development and management of software applications and reduce the expenses of time and money on application development; Redeployment ICT staff on higher-value tasks. (Craig, et al., 2009)

Compatibility:

According to the table (4.35), it's clear that the respondents at MTIT agreed with Compatibility as a facilitator for cloud computing adoption. This factor is one of the main factors that affect the adoption of cloud computing in a positive way, which can be one of the effective factors a positive impact on cloud computing adoption. Furthermore, it is consistent with earlier studies that also identify compatibility as a facilitator of innovation such as (Ghobakhloo et al., 2011; Y.-M. Wang et al., 2010; K. Zhu et al., 2006).

Security:

There is a statistically positive high relationship between security concerns and adoption of cloud computing in implementing the framework. It shows that the security concerns can be one of the effective factors in enterprises, which have a positive impact on cloud computing adoption, and concern of security in the cloud environment is of utmost importance. Also, it will help mitigate existing security and privacy concerns among the organization considering a cloud strategy and its implementation framework.

It is similar to the finding of (Jansen & Grance, 2011) that Cloud services provide all public organizations with computing resources: networks, servers, security, storage, applications, and services.

Also, Jabi and Jaaron (2015) agree with this results because the data will be moved to the outside site of the ministry.

Top management support:

Based on the results in Table there is a statistically positive high relationship between top management support and crucial to the successful the adoption of cloud computing. The results of the analysis show that the top management support can be one of the effective factors in the organization, which have a positive impact on cloud computing adoption. It is similar to the conclusions from many related studies such as Ifinedo, (2011); Low et al., (2011), Ramdani and Kawalek (2009) that shows the levels of adoption of cloud computing are higher when there is support at the top management tier.

Top management is aware of the benefits that can be gained from the adoption of Cloud Computing technology, and provides strong leadership and engages in the process, also the intention to adopt Cloud Computing in the top management implementation in its strategic plan and willing to take risks (financial and organizational).

Relative advantage and knowledge

According to the table (4.35), it's clear that the respondents at MTIT disagreed with relative advantage to adopting Cloud Computing Technology. This reveals that the level of knowledge (which is also is not effective from the research results) of the employees about the benefits and their interest in the Cloud Computing adoption are low, that includes there are different types of cloud (public, private and hybrid cloud) and about the underlying structure of cloud computing; therefore, in our sample the perceived relative advantage of using cloud computing is low. So some individuals who had no information and knowledge about cloud computing especially about it allows us to manage business operations in an efficient way and perform specific tasks more quickly, also enhance our company's data storage capacity; affect negatively in the results of the research.

To solve this issue, the organization must make awareness about the importance of cloud computing adoption and must have a clear understanding of their roles and responsibilities.

This finding is consistent with Jabi and Jaaron (2015) study, that the public sector in Palestine lacks awareness about benefits and objectives of cloud computing adoption.

- **Discussion of How advanced is the existing strategies that target the implementation of cloud computing in MTIT in Palestine**

Cloud computing consider it as the main component of organization overall structure and strategies, for that reason, it is important to convince the stakeholders to integrate within their plans. Part of company's strategies should be directed toward gathering more data about best practice and improving the awareness about cloud computing.

To implement a strategy for cloud computing, the cultural change would be required, how to come up with this change, and how to achieve employee acceptance of the modification. In addition, Partnership/3rd party relational impact, how it increases the strength, reduce the risks and threats, create opportunities, and decrease weaknesses (Ristenpart et al., 2009).

The strategies that target the implementation of cloud computing in the ICT sector at Palestine from the results of the analysis of the questionnaire show us that the strategies are still at the first stage of strategic planning.

The importance of putting a strategy to implement it and also a transformational plan to move to cloud the researcher need to create a framework that applies these needs. Taking into consideration the type of cloud (private, public, and hybrid) and what service model (PaaS, SaaS, IaaS) fits the type of organization and its circumstances.

Cost

Cloud computing cost can play a strategic role organization adoption framework, especially the cost associated with best practices available for adopting that requires a deep understanding of the technology you are adopting as well as the capabilities it provides, includes limited resources, incompatible systems and consuming maintenance. Also, reduce costs by providing cloud environments infrastructure and services and gain greater economies of scale and this will grow their business revenue.

According to table (4.35), it's clear that the respondents at MTIT disagreed with this factor, as mentioned above this is a new technology and coming with capabilities and needs resources to build its infrastructure that will interfere with strategy implementation framework; so annual budget of the ministry is limited and taking into consideration another items to spent on that budget, but we need to increase the knowledge about cloud computing and how it will reduce the total cost especially reduction of energy costs, maintenance costs, and environmental costs. Furthermore, they afraid of hidden cost nightmare that includes rogue cloud deployments, cloud backup, and recovery issues, testing software's before migrating to the cloud, inefficient cloud storage, and data in transit issues.

According to Jabi and Jaaron (2015), they concluded that there is an annual budget to purchase new software and hardware for IT department, but there are limitations that restrict the financial support because of the Palestinian economy depends on the external funds and support.

Regulatory Support

According to table (4.35), it's clear that the respondents at MTIT disagreed with this factor, so they skeptical about more regulations about how that data needs to be managed and the cloud is still relatively new; the legal protection in the use of Cloud Computing and the laws and regulations that exist still in many countries under testing. In addition, Cloud data centers can be geographically dispersed, therefore

Legislative compliance is not currently adequately defined and all stages of the contractual process issues that includes Initial due diligence, Contract negotiation, Implementation, Termination (end of the term or abnormal), Supplier transfer; these terms and definition still new and fresh in our country Palestine to enter in the design of cloud framework.

Organizational Readiness

This new technology is considered one of the strategic digital technologies that enable for productivity and better services, so the Cloud Computing strategic framework adoption development requires that organizations have readiness on multiple scopes including Governance, Process Analyses, Hardware and Software Standardization, involves understanding the existing infrastructure and technical requirements and Application Rationalization and Modernization including how IT staff can be used to support operations. . The organization will use cloud computing to optimize resource utilization and build business models to make it ready to adopt and develop and prepare market strategies that will enable them to grow. The existence of necessary

skills within the company to implement Cloud Computing Readiness, in turn, determines how far organizations can go in their cloud plans with Virtual Desktop, Infrastructure Service, Platform Service and Enterprise Software as Service. Readiness analysis also indicates that certain governance structures are most suitable for cloud adoption on multiple stages in it.

Innovation Level

Based on the results in Table (4.35) there is a statistically negative relationship between innovation level and adoption of cloud computing, the change and move to new technologies in the public sector normally is very slow and requires a lot of new policies and procedures to adopt; local governments are not technology speculators and cannot test out a new technologies, it need proven technology, so the public sector is not the best position to bring us innovation, and this make restriction to staff innovation to test and try the new technologies. Furthermore, the public sector lack of resources to develop a customized solution that fit to them, although there are some governments establishes innovative and fast to adopt new ideas, so the government should be eager and excited to learn these new technologies in the market that are needed to implement the framework strategy.

Discussion of how the cloud computing framework does affect the organization management and improves the service quality in Palestinian MTIT

To encourage sector growth, the ICT sector participants drive to increase Palestinian ICT companies' international market, so Palestinian capabilities in software development are the important subsector that Palestinian companies are able to supply competitively and at high-quality service standards. the cloud computing framework affects the ICT sector in the demand for technical skills that are requiring among Palestinian ICT organization, and research and development opportunities, that are related to innovation, and acquaintance to international capabilities. The lacking of infrastructural elements in Palestine will limit both sizes of the Palestinian ICT sector, and a number of firms offering these high technology services such as cloud computing. E-governmentt, digital media, R&D, etc., will affect the quality of service in Palestine. Furthermore, managing business operations in an efficient way and use cloud computing in perform specific tasks more quickly, and increase business productivity to enhance our company's data storage capacity. Also the fully compatible of cloud computing with current business operations with existing hardware and software that is related to culture and value system of the company. Moreover, the development of a plan to protect the security and confidentiality of information affects the adoption and use of cloud computing technology (PITA, 2013). Furthermore, the company's top management supports affect the implementation of Cloud Computing

through provides strong leadership and engages in the process when it comes to information systems and the company management is willing to take risks. The service quality of Cloud Computing is a critical issue for across the various cloud service models, it should be part of the platform that provides the service, to deliver the promised service quality to the cloud and to avoid idle resources. Also, the quality of service should be measured through the availability and performance measures at different levels of the organization.

Competitive Pressure

Based on the results in Table (4.34) there is a statistically positive high relationship between competitive pressure and adoption of cloud computing and shows that the competitive pressure can be one of the effective factors, which have a positive impact on cloud computing adoption. This finding is consistent with similar studies reported in this area (Zhu et al., 2006; Chang et al.,2013).

Competitive pressure is a facilitator for the adoption of cloud computing when it has an influence on competition in their industry, also the organization is under pressure from competitors to adopt Cloud Computing especially when competitors have already started using this technology.

The quality of service in Palestinian market will be improved taking into consideration the competitive pressure that will exist to attain this new technology, so that denotes the levels of performance, reliability, and availability. Furthermore, growing interested towards understanding better cloud spot markets, where bidding strategies are developed for procuring

computing resources to automate dynamic pricing and cloud resources selection, and this will play a bigger role than today in capacity allocation frameworks in ICT sector.

Trail-ability

Based on the results in a table (4.35) there is a statistically positive high relationship between Trialability and cloud computing adoption. The results of the analysis show that the Trail-ability can be one of the effective factors in the organization, which have a positive impact on cloud computing adoption.

The Trialability of cloud computing may be experimented with on a limited basis in a real-world situation, so that have a great deal of opportunity to try various types of cloud computing, through the necessary skills to implement Cloud Computing and how IT can be used to support operations. So we can establish criteria to validate the cloud solution's compatibility and complexity. In addition, to verify if we need to change your relative advantage, compatibility, and/or complexity assumptions for better or worse that complies with organization management and how it will affect the cloud computing framework in ICT sector and its relationship.

This finding is consistent with similar studies reported in this area (Chen, Yen, & Chen, 2009) and (Chung & Kwon, 2009).

External ICT Support

According to the table (4.35), it's clear that the respondents at MTIT agreed with the availability of External ICT Support and it can be noted that for the majority of respondents the level of external support delivered by cloud providers is important and is needed for Cloud Computing adoption. Furthermore, very good technical support from a cloud provider and receive training from cloud providers.

The Cloud providers offer multiple levels of redundancy, fast configuring and high degrees of flexibility which affect the developing of the adoption framework and the quality of service.

Cloud Computing provider must comply with regulations that monitor security and data privacy issues, also a responsibility to make sure that the provider applies reasonable security controls and has regulatory laws compliance which will improve the service quality and support the organization management decisions in the adoption of cloud computing. It is similar to the conclusions from many related studies such as (Chau & Hui, 2001).

Chapter Five

Conclusion and Recommendations

Chapter Five

Conclusion and Recommendations

5.1 Overview

The results and the findings of the study were tabled were discussed in detail in the previous chapter. This chapter will discuss conclusions, recommendations, and future studies for this research, in order to develop and adopt a framework for cloud computing in Palestinian MTIT.

5.2 Research Conclusions

The research introduced a comprehensive framework for cloud computing adoption after the investigation of the factors that affecting this technology using the two standard frameworks TOE and DOI by respondents from MTIT at Palestine. The framework was reviewed via related literature and expert's opinions in the questionnaire design process. The research framework focuses on the critical factors based on TOE and DOI frameworks, which then focused on Technology factors, Organizational factors, environmental factors and diffusion of innovation factors.

The research analysis had been used the exploratory and descriptive analysis; the research consists of two parts: the first part is an exploratory research used though Literature review which reviewed previous article and studies, international journal papers, books, and the internet. The second part is a descriptive analytical approach by using quantitative survey which was distributed with sample size (n=85) of employees at MTIT in Palestine which

tries to achieve research's objectives by testing the determinant factors and to test hypotheses. The researcher retrieved 69 responses with a response rate of 92%.

The research questionnaire was collected, then its variables were coded and defined into the (SPSS v21) program by which various statistical analysis tools such as frequency, means, percentages, linear regression, Pearson correlation, and ANOVA test, in order to investigate factors that influence cloud computing adoption in the ministry.

Furthermore, Palestinian ministry of telecommunication and IT encourages and tries to adopt some projects that support the adoption process; Cloud Computing helps in replacing enterprise hardware and software with their traditional technology.

The previous conclusions can be summarized as based on the research findings: The Palestinian ministry of telecommunication and IT is ready to adopt Cloud Computing in its operations.

5.3 Recommendations

There are some recommendations that can be represented to adopt cloud computing in Palestinian ministry of telecommunication and IT based on the findings of this research as the following:

1. The Ministry should encourage their IT department to use of hybrid cloud computing which can greatly enhance interactions between the new and the old technology. This process needs exchange experience between employees to proceed.

2. IT department of the ministry should cooperate with the private companies (Public Private Partnership) in Palestine to provide their experience and knowledge about the adoption process order to increase the self-efficacy and productivity of the employees.
3. The Ministry should send their employees to an adequate training course that are related to cloud computing technology thus enhancing their perceived ease of use of it and ready to operate and run the new systems with high availability and successfully
4. The Ministry management should have committed to a successful implementation and use of cloud computing adoption in the ministry which is considered to be the weakest in the field of top management support.
5. The Ministry should increase the level of awareness and knowledge about cloud computing which will apply the vision and mission of the ministry according to be considered the new concept that will enter the ministry.
6. The Ministry should develop a complete evaluation system directly related with the process of cloud computing adoption in order to feedback the top management and IT administrators who monitor the new system and showing the benefits resulting from the use of cloud computing and its positive impact on their job performance.
7. The Ministry should coordinate with experts in the field of cloud computing which have success stories and who applied the best practice to build a robust system with full efficiency and effectiveness.

8. The Ministry top management should have eliminated any obstacle that will stop or slow the use of any new technology such as Cloud Computing technology.
9. The Ministry should insert cloud computing adoption process in their short-term and long-term strategies; which will affect the technological and economic option.
10. The Ministry should commit particular budget to the adoption process of Cloud Computing in its operational cost plan.
11. The Ministry should prepare the IT infrastructure to support the adoption of Cloud Computing with a high qualified expert from both the private and public sector.
12. The Ministry should have sent their IT employees to international conferences and workshops to cover all sides of this new technology and get the experience and lessons learned from the abroad countries that successfully adopted cloud computing.
13. The Ministry should take in consideration the legal and legislative laws that which related to Privacy and Data Security Laws and Regulations, policies and procedures should be implemented.
14. The Ministry should spread this new technology to other ministries in the public sectors as it considered the leader in this field after the successful implementation of cloud computing.

5.4 Research Contribution

- First Contribution

  Based on the findings of this study, the following factors were observed, namely: Relative Advantage, Compatibility, Security, Cost, Knowledge, Top Management Support, Competitive Advantage, Regulatory Support, Adoption Complexity, Trialability, Organization Readiness, Innovation Level and External Support, which considered as a critical factors relating to the adoption of cloud computing. This research shows that trust in these factors will consist a robust framework to adopt cloud computing.

- Second Contribution

  The conceptual model developed in this study is the second contribution, which has been proposed in this research, which contains the cloud computing adoption determinants that are adapted from other studies, from both two standard frameworks TOE and DOI for adoption. This modified model can be used in other ministries or agencies, to develop it to suit their variables.

- Third Contribution

  Not only academic field will get benefit from this study, also the business practitioners, the result of this study can be used by cloud providers to help them in realizing the critical factors which are not connected to the technology, although it will affect the decision-making process.

- Fourth Contribution

  Increasing the awareness of the importance cloud computing technology and its different aspects, such as its infrastructure and different types of deployment models. According to our results, this awareness will have a direct positive effect towards cloud computing concept. Furthermore, the cloud providers will pay attention to enhancement strategies that are related to cloud computing adoption.

5.5 Research Limitations

The research applied on one institution separated from other ministries which may affect some factors to be considered so that the findings of the research will not reflect the general case of the adoption process in the Palestinian organizations either the private or the public. Also, this research results cannot be generalized, due to the questionnaire distributed only in Palestinian MTIT, in addition, so it is only applicable to small size sample of the study, on the other hand, other studies used large sample size and in large ICT sectors.

Finally, the knowledge about cloud computing in Palestine in general still at its first stages and a new phenomenon, so the collection of data will be hard and this will reduce the number of studies that will be conducted to this new field.

5.6 Future Research

This research study might be useful for researchers who will make researches in this field in the future. In the previous section, the limitations of the study can be used to focus on it each of them as case by case. The elements below could be studied in the future:

1. Explore other factors that are related to cloud computing adoption for both private and public sector.
2. Studying a general model that can be applied to deal with the traditional technology through moving to a hybrid model.
3. Conduct a research to relate the quality, strategy, efficiency, compatibility hurdles and cost-effectiveness, so that create a model to study all of them together.
4. Studying how the cloud computing can help and effects of data mining, big data, and internet of things.

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Appendices

Appendix A

Preliminary Questionnaire

Survey of Framework for the adoption of Cloud Computing in Palestinian Ministry of Telecommunication and Information Technology

YOUR LOGO HERE

Dear Respondent.

The researcher is doing a study on Framework for the adoption of Cloud Computing in Palestinian Ministry of Telecommunication and Information Technology.

In order to achieve that, the researcher designed this questionnaire which is divided into two parts: the first one is personal functional information, the second part aims to assess the items of Cloud Computing adoption in the Palestinian Ministry of Telecommunication and Information Technology.

I would appreciate your answers to this questionnaire and emphasize that you will present a great service to the research process in the Palestinian universities.

We believe that you are the best source to get the required information which serves our community and its development. We all hope that you will be cooperative through answering the questions contained in this survey. We pledge not to enclose the identity of participants to third party, as well as not use this information in any field except scientific research.

Kind Regards,

Researcher

Eng. Mahmoud Younes

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0599700223

Part One: Personal Functional Information

Please put (x) letter in the box that is related to your answer.

1. Gender: ☐ Male ☐ Female

2. Qualification:

☐Diploma or less ☐ Bachelor ☐ Higher Education

3. Age

☐ 30 years or less ☐ 30 - 40 years ☐40 - 50 years ☐More than 50 years

4. Specialty:

☐Administration ☐Engineering ☐IT

☐other (Please specify) …….....

5. Experience's years:

☐ 2 years or less ☐ 3 - 5 years ☐ 6 - 10 years ☐More than 10 years

6. Position or Job Title:

☐ Director ☐ IT Manager ☐ System Admin/Engineer

☐ Network Admin/Engineer ☐ Management Employee ☐ Database Administrator ☐ Telecommunication Engineer

☐ Other (Please specify) …….

Part Two: Please indicate the extent to which you agree or disagree with the following statements

6.1.1 Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6.1.2 Relative Advantage					
Cloud Computing allows you to manage business operations in an efficient way.					
The use of Cloud Computing services improves the quality of operation					
Using Cloud Computing allows you to perform specific tasks more quickly.					
Using Cloud Computing allows you to increase business productivity.					
Cloud computing allows us to use the latest version of the technology					
Cloud computing would enhance our company’s data storage capacity					
6.1.3 Compatibility					
The use of Cloud Computing fits the work style of the company.					
The use of Cloud Computing is fully compatible with current business operations.					
Using Cloud Computing is compatible with your company's corporate culture and value system.					
The use of Cloud Computing will be compatible with existing hardware and software in the ministry.					
Cloud can easily be integrated into our existing IT infrastructure					
6.1.4 Security					
Degree of ministry’s concern with data security and privacy on the Cloud Computing					
Degree of concern for customers with data security in Cloud Computing					
Adoption and use of cloud computing technology affects the development of a plan to protect the security and confidentiality of information					
Cloud providers' servers and data centres are secure					
6.1.5 Cost					
The benefits of Cloud Computing are greater than the costs of this adoption.					
With Cloud Computing there is a reduction of energy costs and environmental costs.					
Maintenance costs of Cloud Computing are very low					

Cloud knowledge					
I have the knowledge about cloud computing					
I have the knowledge about the benefits of using cloud computing					
I know about different types of cloud (public, private and hybrid cloud)					
I have the knowledge about the underlying structure of cloud computing					
Top Management Support					
The company's management supports the implementation of Cloud Computing.					
The company's top management provides strong leadership and engages in the process when it comes to information systems company.					
The company management is willing to take risks (financial and organizational) involved in the adoption of Cloud Computing.					
Competitive Pressure					
The Ministry think that Cloud Computing has an influence on competition in their industry.					
Our ministry is under pressure from competitors to adopt Cloud Computing.					
Some of our competitors have already started using Cloud Computing					
Regulatory Support					
There is legal protection in the use of Cloud Computing					
The laws and regulations that exist nowadays are sufficient to protect the use of Cloud Computing.					
Cloud Computing Adoption					
The organization is currently engaged with Cloud Computing adoption					
I recommend the organization to evaluate Cloud Computing adoption , but do not plan to adopt this technology					
I recommend the organization to adopt services, infrastructure or platforms of Cloud Computing.					
The ministry has a management plan its goal to adopt cloud computing					
There is an adequate budget to adopt Cloud Computing in the ministry.					

Complexity					
Working with cloud computing is complicated					
It takes too long to learn how to use the cloud computing					
In general cloud computing is very complex to use					
Trail-ability					
I have a great deal of opportunity to try various types of cloud computing					
Cloud computing is available to me to adequately test run various applications Before deciding whether to use any cloud computing service					
I would able to properly try them out and its services easily					
Organizational Readiness					
The ministry knows how IT can be used to support operations.					
There are within the company the necessary skills to implement Cloud Computing.					
Level of Innovativeness					
I am a kind of person who usually comes up with new ideas					
I would rather create something new than improve something existing					
I often take risk doing things differently					
External ICT Support					
For our ministry, receiving an excellent technical support from cloud provider is					
For our ministry receiving an exceptional customer service is					
for our ministry, offering customer hot-lines by cloud providers is					
It is important for our ministry to receive training from cloud providers					

الموضوع: طلب تعبئة استبانة

إطار عمل لتبني الحوسبة السحابية في وزارة الاتصالات وتكنولوجيا المعلومات الفلسطينية

عزيزي المشارك:

أشكرك على تخصيص جزء من وقتك لتعبئة هذا الاستبيان الذي يهدف الى تطوير إطار عمل لتبني الحوسبة السحابية في وزارة الاتصالات وتكنولوجيا المعلومات الفلسطينية, وذلك لاستكمال متطلبات الحصول على درجة الماجستير في الادارة الهندسية والحصول على افضل النتائج لتطوير العمل في القطاع التكنولوجي في دولة فلسطين.

ينقسم هذا الاستبيان الى قسمين :

القسم الاول: يهدف الى جمع معلومات عامة .

القسم الثاني: يرنو الى تقييم العوامل الاساسية في تطوير إطار عمل لتبني الحوسبة السحابية في وزارة الاتصالات وتكنولوجيا المعلومات الفلسطينية

هذا التقييم سوف يستغرق حوالي 10 دقائق لاستكماله. الرجاء قراءة جميع عناصر الاستبانة بدقة , ووضع الدرجة التي تراها مناسبة امام كل عنصر بموضوعية وحياد وذلك بأن جهودك هي خدمة كبيرة للبحث العلمي في فلسطين ونعتقد انك أفضل مصدر للوصول الى المعلومات المطلوبة التي تؤدي هذا المطلوب. علما أن المعلومات ستكون سرية ولن تستخدم إلا لأغراض البحث العملي.

أطيب التحيات

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تعريف الحوسبة السحابية (Cloud Computing):

هي القيام باستخدام المصادر الحوسبية (برمجيات ومعدات) عن طريق الانترنت، والتي تكون مقدمة للمستخدم بشكل خدمة، اي ان المستخدم لا يهتم بالكيفية التي تعمل بها هذه الخدمة او كيفية تشغيلها او اتصالها ببعضها البعض، اوكيفية اعداد الشبكة او البرمجيات المثبتة عليها.

القسم الأول :

البيانات الشخصية والوظيفية:

يرجى التكرم بوضع إشارة (√) أمام الإجابة المناسبة.

1. الجنس: ☐ ذكر ☐أنثى

2. المؤهل العلمي ☐ دبلوم فأقل ☐ بكالوريوس ☐ دراسات عليا

3. العمر ....

4. التخصص

☐ إدارة ☐ هندسة ☐ تكنولوجيا المعلومات☐ غير ذلك (حدد رجاءً .....)

5. سنوات الخبرة

☐ أقل من سنتين ☐ سنتين – 5 سنوات ☐6 – 10 سنوات ☐أكثر من 10 سنوات

6. المسمى الوظيفي (إختر واحدة فقط رجاءً)

☐ مدير ☐مدير تقني ☐ مدير/ مهندس نظم ☐ مدير/ مهندس شبكات

☐موظف إداري ☐ مدير قواعد البيانات ☐ مهندس اتصالات

☐غير ذلك (حدد رجاءً .....)

القسم الثاني: يرجى الإشارة إلى أي مدى توافق أو لا توافق على العبارات التالية :

	العبارات	أعارض بشدة	أعارض	محايد	أوافق	أوافق بشدة
A.	**مزايا الحوسبة السحابية**					
1.	الحوسبة السحابية تسمح لك بادارة عمليات العمل بطريقة فعالة					
2.	استخدام خدمات الحوسبة السحابية يحسن نوعية العملية					
3.	استخدام الحوسبة السحابية يسمح لك لأداء مهام محددة بسرعة أكبر.					
4.	استخدام الحوسبة السحابية يسمح لك لزيادة إنتاجية العمل.					
5.	تتيح الحوسبة السحابية لنا لاستخدام أحدث إصدار من التكنولوجيا					
6.	إن الحوسبة السحابية تحسن قدرة تخزين البيانات الخاصة بالوزارة					
B.	**التوافقية**					
1.	استخدام الحوسبة السحابية يناسب نمط عمل الوزارة.					
2.	استخدام الحوسبة السحابية متوافق تماما مع أعمال الوزارة الحالية.					
3.	باستخدام الحوسبة السحابية متوافق مع ثقافة الوزارة ونظام القيم.					
4.	إن استخدام الحوسبة السحابية تكون متوافقة مع الأجهزة الموجودة والبرمجيات في الوزارة.					
5.	الحوسبة السحابية تمكن التكامل بسهولة مع البنية التحتية لتكنولوجيا المعلومات الموجودة لدينا					
C.	**الامن**					
1.	تهتم الوزارة بموضوع أمن البيانات على الحوسبة السحابية، ومكان تخزين هذه البيانات					
2.	يهتم المستفيدين من خدمات الوزارة بأمن البيانات في الحوسبة السحابية وموثوقية الاعتماد عليها					
3.	اعتماد واستخدام تكنولوجيا الحوسبة السحابية يؤثر في وضع خطة لحماية أمن وسرية المعلومات					
4.	خوادم مزودي الحوسبة السحابية ومراكز البيانات آمنة					
D.	**التكلفة**					
1.	فوائد الحوسبة السحابية هي أكبر من تكاليف التبني لها					
2.	مع الحوسبة السحابية هناك انخفاض تكاليف الطاقة والتكاليف البيئية(صديقة للبيئة).					
3.	تكاليف صيانة الحوسبة السحابية منخفضة نسبيا					
E.	**المعرفة**					
1.	لدي المعرفة حول الحوسبة السحابية					
2.	لدي المعرفة حول فوائد استخدام الحوسبة السحابية					
3.	لدي المعرفة حول انواع الحوسبة السحابية(عامة,خاصة,مهجنة)					
4.	لدي المعرفة حول التكوين للبنية التحتية للحوسبة السحابية					
F.	**دعم الإدارة العليا**					
1.	تدعم إدارة الوزارة تنفيذ الحوسبة السحابية.					
2.	تقدم الإدارة العليا للوزارة قيادة قوية وتشارك في العملية عندما يتعلق الأمر بموضوع نظم المعلومات.					
3.	إدارة الوزارة على استعداد لتحمل المخاطر (المالية والتنظيمية) التي ينطوي عليها اعتماد الحوسبة السحابية.					
G.	**الضغط التنافسي**					

	العبارات	أعارض بشدة	أعارض	محايد	أوافق	أوافق بشدة
1.	الوزارة تعتقد أن الحوسبة السحابية لها تأثير على المنافسة في عملهم.					
2.	الوزارة تحت ضغوط من المنافسين لتبني الحوسبة السحابية.					
3.	بدأ بعض المنافسين بالفعل باستخدام الحوسبة السحابية					
H.	**الدعم التنظيمي**					
1.	هناك حماية قانونية باستخدام الحوسبة السحابية					
2.	القوانين واللوائح التي توجد في الوقت الحاضر هي كافية لحماية استخدام الحوسبة السحابية.					
I.	**التبني**					
1.	تشارك الوزارة الان في استخدام الحوسبة السحابية					
2.	أقترح على الوزارة ان تقيم خيار تنبي الحوسبة السحابية, ولكن لا تخطط لتبني هذه التكنولوجيا					
3.	أقترح على الوزارة ان تتبنى الخدمات والبنية التحتية المتعلقة بالحوسبة السحابية					
4.	لدي الوزارة بالفعل خطة إدارية، تهدف إلى تبني الحوسبة السحابية					
5.	يتم رصد ميزانية سنوية مخصصة لشراء معدات وبرمجيات جديدة لدعم عملية التبني للحوسبة السحابية					
J.	**درجة التعقيد**					
1.	يستغرق وقتا طويلا لمعرفة كيفية استخدام الحوسبة السحابية					
2.	بشكل عام الحوسبة السحابية هي معقدة جدا للاستخدام					
3.	العمل مع الحوسبة السحابية معقد					
K.	**القدرة على التدرب**					
1.	لدي الموظفين الفرص للمحاولة التدرب على أنواع مختلفة من الحوسبة السحابية					
2.	الحوسبة السحابية هي المتاحة للموظفين من أجل أن يبدأ تشغيله التجريبى في مختلف التطبيقات قبل أن تقرر ما إذا كان استخدام أي خدمة الحوسبة السحابية					
3.	يتمكن الموظف من تجربة الحوسبة السحابية وخدماتها بشكل سهل					
L.	**الجاهزية التنظيمية**					
1.	الوزارة تعرف كيف يمكن أن تستخدم تكنولوجيا المعلومات لدعم العمليات المتعلقة بالحوسبة السحابية					
2.	يوجد في داخل الوزارة المهارات اللازمة لتنفيذ الحوسبة السحابية.					
M.	**مستوى الابتكار**					
1.	انا نوع من الاشخاص الذين عادة يأتون بأفكار جديدة					
2.	لدي الرغبة في إنشاء شيء جديد بدلا من تطوير شيء موجود					
3.	أنا غالبا ما أخاطر القيام بالأمور بشكل مختلف					
N.	**الدعم الخارجي في مجال تكنولوجيا المعلومات والاتصالات**					
1.	الوزارة تتلقى الدعم الفني الممتاز من مزود الحوسبة السحابية					
2.	يتلقى المستفيدين من خدمات الوزارة خدمة مميزة					
3.	يتم تزويد المستفيدين من خدمات الوزارة بخطوط ساخنة من قبل مقدمي خدمة الحوسبة السحابية					
4.	من المهم بالنسبة لوزارتنا تلقي التدريب من مقدمي خدمة الحوسبة السحابية					

ولكم جزيل الشكر و العرفان ،،

Appendix B: Tables

Table (4.9) Descriptive Statistics among Participants according to Qualification

Factor	Qualification	N	Mean	Std. Deviation	Std. Error
Relative Advantage	Diploma	6	4.4167	.43141	.17612
	Bachelor	47	4.1206	.48242	.07037
	GraduateStudies	16	3.8750	.52529	.13132
	Total	69	4.0894	.50292	.06054
Compatibility	Diploma	6	3.4333	.57155	.23333
	Bachelor	47	3.6000	.62276	.09084
	GraduateStudies	16	3.6875	.57489	.14372
	Total	69	3.6058	.60291	.07258
Security	Diploma	6	3.7917	1.02977	.42040
	Bachelor	47	3.5160	.68446	.09984
	GraduateStudies	16	3.5313	.68237	.17059
	Total	69	3.5435	.70965	.08543
Cost	Diploma	6	3.8889	.62063	.25337
	Bachelor	47	3.7660	.65539	.09560
	GraduateStudies	16	3.7500	.49441	.12360
	Total	69	3.7729	.61169	.07364
Knowledge	Diploma	6	3.6667	.51640	.21082
	Bachelor	47	3.3032	.74625	.10885
	GraduateStudies	16	3.4844	.83899	.20975
	Total	69	3.3768	.75199	.09053
Top Management Support	Diploma	6	3.5556	1.02560	.41870
	Bachelor	47	3.1844	.78884	.11506
	GraduateStudies	16	3.4167	.71492	.17873
	Total	69	3.2705	.79269	.09543
Competitive Advantage	Diploma	6	3.3889	.87981	.35918
	Bachelor	47	3.2340	.60159	.08775
	GraduateStudies	16	3.2708	.80938	.20234
	Total	69	3.2560	.66947	.08059
Regulatory Support	Diploma	6	3.8333	.81650	.33333
	Bachelor	47	2.9149	.87426	.12752

	GraduateStudies	16	2.6563	1.06017	.26504
	Total	69	2.9348	.95067	.11445
Adoption	Diploma	6	3.6667	.48442	.19777
	Bachelor	47	3.2766	.61652	.08993
	GraduateStudies	16	3.4750	.56980	.14245
	Total	69	3.3565	.60183	.07245
Complexity	Diploma	6	2.3889	.95258	.38889
	Bachelor	47	2.6525	.85397	.12456
	GraduateStudies	16	2.7083	.85093	.21273
	Total	69	2.6425	.85237	.10261
Trialability	Diploma	6	3.7222	.61162	.24969
	Bachelor	47	3.4397	.62595	.09130
	GraduateStudies	16	3.3542	.80248	.20062
	Total	69	3.4444	.66585	.08016
Organization Readiness	Diploma	6	3.5000	1.09545	.44721
	Bachelor	47	3.3617	.77110	.11248
	GraduateStudies	16	3.4375	.87321	.21830
	Total	69	3.3913	.81290	.09786
Innovation Level	Diploma	6	4.0000	.55777	.22771
	Bachelor	47	3.5957	.69134	.10084
	GraduateStudies	16	3.4583	1.16667	.29167
	Total	69	3.5990	.81566	.09819
External Support	Diploma	6	3.2917	.85756	.35010
	Bachelor	47	3.2766	.64529	.09412
	GraduateStudies	16	3.2969	.70249	.17562
	Total	69	3.2826	.66685	.08028

Table (4.11) Descriptive Statistics among Participants according to Age

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Relative Advantage	<=30	22	4.2803	.42844	.09134	4.0903	4.4703
	30-40	32	4.0052	.47610	.08416	3.8336	4.1769
	41-50	8	3.9583	.80549	.28478	3.2849	4.6317
	>50	7	4.0238	.31074	.11745	3.7364	4.3112
	Total	69	4.0894	.50292	.06054	3.9686	4.2102
Compatibility	<=30	22	3.6636	.51782	.11040	3.4340	3.8932
	30-40	32	3.6000	.64857	.11465	3.3662	3.8338
	41-50	8	3.3750	.77414	.27370	2.7278	4.0222
	>50	7	3.7143	.45981	.17379	3.2890	4.1395
	Total	69	3.6058	.60291	.07258	3.4610	3.7506
Security	<=30	22	3.6477	.73864	.15748	3.3202	3.9752
	30-40	32	3.4219	.74714	.13208	3.1525	3.6912
	41-50	8	3.5000	.46291	.16366	3.1130	3.8870
	>50	7	3.8214	.67259	.25422	3.1994	4.4435
	Total	69	3.5435	.70965	.08543	3.3730	3.7140
Cost	<=30	22	3.7727	.75162	.16025	3.4395	4.1060
	30-40	32	3.6979	.59484	.10515	3.4835	3.9124
	41-50	8	3.8333	.35635	.12599	3.5354	4.1312
	>50	7	4.0476	.40500	.15307	3.6731	4.4222
	Total	69	3.7729	.61169	.07364	3.6260	3.9199
Knowledge	<=30	22	3.2727	.74366	.15855	2.9430	3.6024
	30-40	32	3.2891	.84269	.14897	2.9852	3.5929
	41-50	8	3.5313	.43172	.15264	3.1703	3.8922
	>50	7	3.9286	.34503	.13041	3.6095	4.2477
	Total	69	3.3768	.75199	.09053	3.1962	3.5575
Top Management Support	<=30	22	3.3333	.84202	.17952	2.9600	3.7067
	30-40	32	3.2188	.85764	.15161	2.9095	3.5280
	41-50	8	3.2083	.53266	.18832	2.7630	3.6537
	>50	7	3.3810	.67847	.25644	2.7535	4.0084
	Total	69	3.2705	.79269	.09543	3.0801	3.4610
Competitive Advantage	<=30	22	3.2576	.55331	.11797	3.0122	3.5029
	30-40	32	3.3333	.70329	.12433	3.0798	3.5869
	41-50	8	2.9583	.41547	.14689	2.6110	3.3057
	>50	7	3.2381	1.04906	.39651	2.2679	4.2083
	Total	69	3.2560	.66947	.08059	3.0952	3.4169

Regulatory Support	<=30	22	3.0682	1.01530	.21646	2.6180	3.5183
	30-40	32	2.9063	.94560	.16716	2.5653	3.2472
	41-50	8	2.6250	.44320	.15670	2.2545	2.9955
	>50	7	3.0000	1.25831	.47559	1.8363	4.1637
	Total	69	2.9348	.95067	.11445	2.7064	3.1632
Adoption	<=30	22	3.3455	.48278	.10293	3.1314	3.5595
	30-40	32	3.4063	.71569	.12652	3.1482	3.6643
	41-50	8	3.0000	.32071	.11339	2.7319	3.2681
	>50	7	3.5714	.53452	.20203	3.0771	4.0658
	Total	69	3.3565	.60183	.07245	3.2119	3.5011
Complexity	<=30	22	2.4545	.88219	.18808	2.0634	2.8457
	30-40	32	2.8438	.87574	.15481	2.5280	3.1595
	41-50	8	2.5417	.58926	.20833	2.0490	3.0343
	>50	7	2.4286	.85449	.32297	1.6383	3.2188
	Total	69	2.6425	.85237	.10261	2.4378	2.8473
Trialability	<=30	22	3.6818	.61272	.13063	3.4102	3.9535
	30-40	32	3.4063	.63773	.11274	3.1763	3.6362
	41-50	8	3.0833	.42725	.15105	2.7261	3.4405
	>50	7	3.2857	.98936	.37394	2.3707	4.2007
	Total	69	3.4444	.66585	.08016	3.2845	3.6044
Organization Readiness	<=30	22	3.3182	.97034	.20688	2.8880	3.7484
	30-40	32	3.4531	.78657	.13905	3.1695	3.7367
	41-50	8	3.3750	.64087	.22658	2.8392	3.9108
	>50	7	3.3571	.69007	.26082	2.7189	3.9953
	Total	69	3.3913	.81290	.09786	3.1960	3.5866
Innovation Level	<=30	22	3.5909	.96462	.20566	3.1632	4.0186
	30-40	32	3.6771	.76895	.13593	3.3998	3.9543
	41-50	8	3.2917	.41547	.14689	2.9443	3.6390
	>50	7	3.6190	.93152	.35208	2.7575	4.4806
	Total	69	3.5990	.81566	.09819	3.4031	3.7950
External Support	<=30	22	3.3864	.68455	.14595	3.0828	3.6899
	30-40	32	3.2734	.70813	.12518	3.0181	3.5287
	41-50	8	3.1875	.39528	.13975	2.8570	3.5180
	>50	7	3.1071	.73396	.27741	2.4283	3.7859
	Total	69	3.2826	.66685	.08028	3.1224	3.4428

Table (4.13) Descriptive Statistics among Participants according to Specialty

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Relative Advantage	management	18	4.1574	.52851	.12457	3.8946	4.4202
	engineer	25	4.1600	.55168	.11034	3.9323	4.3877
	IT	10	3.8000	.43603	.13789	3.4881	4.1119
	other	16	4.0833	.39907	.09977	3.8707	4.2960
	Total	69	4.0894	.50292	.06054	3.9686	4.2102
Compatibility	management	18	3.7889	.31039	.07316	3.6345	3.9432
	engineer	25	3.6720	.71386	.14277	3.3773	3.9667
	IT	10	3.0800	.56725	.17938	2.6742	3.4858
	other	16	3.6250	.54589	.13647	3.3341	3.9159
	Total	69	3.6058	.60291	.07258	3.4610	3.7506
Security	management	18	3.5556	.48169	.11354	3.3160	3.7951
	engineer	25	3.6300	.75042	.15008	3.3202	3.9398
	IT	10	3.0000	.73598	.23274	2.4735	3.5265
	other	16	3.7344	.73863	.18466	3.3408	4.1280
	Total	69	3.5435	.70965	.08543	3.3730	3.7140
Cost	management	18	3.8333	.65927	.15539	3.5055	4.1612
	engineer	25	3.9867	.55678	.11136	3.7568	4.2165
	IT	10	3.7333	.40976	.12958	3.4402	4.0265
	other	16	3.3958	.61124	.15281	3.0701	3.7215
	Total	69	3.7729	.61169	.07364	3.6260	3.9199
Knowledge	management	18	3.1389	.92443	.21789	2.6792	3.5986
	engineer	25	3.5700	.67129	.13426	3.2929	3.8471
	IT	10	3.5500	.69522	.21985	3.0527	4.0473
	other	16	3.2344	.64206	.16051	2.8922	3.5765
	Total	69	3.3768	.75199	.09053	3.1962	3.5575
Top Management Support	management	18	3.2037	.64816	.15277	2.8814	3.5260
	engineer	25	3.2933	.85158	.17032	2.9418	3.6448
	IT	10	2.7333	.87206	.27577	2.1095	3.3572
	other	16	3.6458	.63792	.15948	3.3059	3.9858
	Total	69	3.2705	.79269	.09543	3.0801	3.4610
Competitive Advantage	management	18	3.0741	.61096	.14401	2.7702	3.3779
	engineer	25	3.5067	.75228	.15046	3.1961	3.8172
	IT	10	2.8000	.44997	.14229	2.4781	3.1219
	other	16	3.3542	.53705	.13426	3.0680	3.6403
	Total	69	3.2560	.66947	.08059	3.0952	3.4169
Regulatory Support	management	18	3.0278	.65242	.15378	2.7033	3.3522
	engineer	25	2.9600	1.12657	.22531	2.4950	3.4250
	IT	10	2.5500	.83166	.26300	1.9551	3.1449
	other	16	3.0313	1.02419	.25605	2.4855	3.5770

	Total	69	2.9348	.95067	.11445	2.7064	3.1632
Adoption	management	18	3.3111	.59100	.13930	3.0172	3.6050
	engineer	25	3.5360	.63435	.12687	3.2742	3.7978
	IT	10	3.0200	.52873	.16720	2.6418	3.3982
	other	16	3.3375	.55000	.13750	3.0444	3.6306
	Total	69	3.3565	.60183	.07245	3.2119	3.5011
Complexity	management	18	2.5926	.83670	.19721	2.1765	3.0087
	engineer	25	2.6400	.99963	.19993	2.2274	3.0526
	IT	10	2.1333	.23307	.07370	1.9666	2.3001
	other	16	3.0208	.73504	.18376	2.6292	3.4125
	Total	69	2.6425	.85237	.10261	2.4378	2.8473
Trialability	management	18	3.6852	.41965	.09891	3.4765	3.8939
	engineer	25	3.5067	.68123	.13625	3.2255	3.7879
	IT	10	3.3000	.61764	.19532	2.8582	3.7418
	other	16	3.1667	.81650	.20412	2.7316	3.6017
	Total	69	3.4444	.66585	.08016	3.2845	3.6044
Organization Readiness	management	18	3.6389	.47914	.11293	3.4006	3.8772
	engineer	25	3.2600	.80519	.16104	2.9276	3.5924
	IT	10	3.1000	.77460	.24495	2.5459	3.6541
	other	16	3.5000	1.08012	.27003	2.9244	4.0756
	Total	69	3.3913	.81290	.09786	3.1960	3.5866
Innovation Level	management	18	3.6111	.63914	.15065	3.2933	3.9289
	engineer	25	3.6133	.88548	.17710	3.2478	3.9788
	IT	10	3.7333	.58373	.18459	3.3158	4.1509
	other	16	3.4792	1.03257	.25814	2.9289	4.0294
	Total	69	3.5990	.81566	.09819	3.4031	3.7950
External Support	management	18	3.2639	.76923	.18131	2.8814	3.6464
	engineer	25	3.3500	.72169	.14434	3.0521	3.6479
	IT	10	2.7750	.43221	.13668	2.4658	3.0842
	other	16	3.5156	.40279	.10070	3.3010	3.7303
	Total	69	3.2826	.66685	.08028	3.1224	3.4428

Table 4-16 LSD test with Specialty descriptive determinant

Multiple Comparisons

LSD

Dependent Variable	(I) Specialty	(J) Specialty	Mean Difference (I-J)	Std. Error	Sig.
Compatibility	management	engineer	.11689	.17668	.511
		IT	.70889*	.22543	.003
		other	.16389	.19638	.407
	engineer	management	-.11689	.17668	.511
		IT	.59200*	.21386	.007
		other	.04700	.18299	.798
	IT	management	-.70889*	.22543	.003
		engineer	-.59200*	.21386	.007
		other	-.54500*	.23040	.021
	other	management	-.16389	.19638	.407
		engineer	-.04700	.18299	.798
		IT	.54500*	.23040	.021
Security	management	engineer	-.07444	.21181	.726
		IT	.55556*	.27025	.044
		other	-.17882	.23543	.450
	engineer	management	.07444	.21181	.726
		IT	.63000*	.25638	.017
		other	-.10438	.21937	.636
	IT	management	-.55556*	.27025	.044
		engineer	-.63000*	.25638	.017
		other	-.73438*	.27622	.010
	other	management	.17882	.23543	.450
		engineer	.10438	.21937	.636
		IT	.73438*	.27622	.010
Cost	management	engineer	-.15333	.17961	.396
		IT	.10000	.22916	.664
		other	.43750*	.19964	.032
	engineer	management	.15333	.17961	.396
		IT	.25333	.21740	.248
		other	.59083*	.18602	.002
	IT	management	-.10000	.22916	.664
		engineer	-.25333	.21740	.248
		other	.33750	.23422	.154
	other	management	-.43750*	.19964	.032
		engineer	-.59083*	.18602	.002
		IT	-.33750	.23422	.154
Top Management Support	management	engineer	-.08963	.23478	.704
		IT	.47037	.29955	.121
		other	-.44213	.26096	.095

	engineer	management	.08963	.23478	.704
		IT	.56000	.28418	.053
		other	-.35250	.24316	.152
	IT	management	-.47037	.29955	.121
		engineer	-.56000	.28418	.053
		other	-.91250*	.30617	.004
	other	management	.44213	.26096	.095
		engineer	.35250	.24316	.152
		IT	.91250*	.30617	.004
Competitive Advantage	management	engineer	-.43259*	.19579	.031
		IT	.27407	.24981	.277
		other	-.28009	.21763	.203
	engineer	management	.43259*	.19579	.031
		IT	.70667*	.23699	.004
		other	.15250	.20278	.455
	IT	management	-.27407	.24981	.277
		engineer	-.70667*	.23699	.004
		other	-.55417*	.25533	.034
	other	management	.28009	.21763	.203
		engineer	-.15250	.20278	.455
		IT	.55417*	.25533	.034
External Support	management	engineer	-.08611	.19802	.665
		IT	.48889	.25266	.057
		other	-.25174	.22010	.257
	engineer	management	.08611	.19802	.665
		IT	.57500*	.23969	.019
		other	-.16562	.20509	.422
	IT	management	-.48889	.25266	.057
		engineer	-.57500*	.23969	.019
		other	-.74063*	.25823	.006
	other	management	.25174	.22010	.257
		engineer	.16562	.20509	.422
		IT	.74063*	.25823	.006

*. The mean difference is significant at the 0.05 level.

Table (4.17) Descriptive Statistics among Participants according to Experience Years

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Relative Advantage	<2	3	4.3333	.44096	.25459	3.2379	5.4287
	2-5	12	4.3194	.40488	.11688	4.0622	4.5767
	5-10	22	4.0000	.57044	.12162	3.7471	4.2529
	>10	32	4.0417	.47895	.08467	3.8690	4.2143
	Total	69	4.0894	.50292	.06054	3.9686	4.2102
Compatibility	<2	3	3.4667	.41633	.24037	2.4324	4.5009
	2-5	12	3.7000	.57525	.16606	3.3345	4.0655
	5-10	22	3.6909	.59754	.12740	3.4260	3.9558
	>10	32	3.5250	.64006	.11315	3.2942	3.7558
	Total	69	3.6058	.60291	.07258	3.4610	3.7506
Security	<2	3	3.8333	.76376	.44096	1.9360	5.7306
	2-5	12	3.7292	.78667	.22709	3.2293	4.2290
	5-10	22	3.6932	.67229	.14333	3.3951	3.9913
	>10	32	3.3438	.68022	.12025	3.0985	3.5890
	Total	69	3.5435	.70965	.08543	3.3730	3.7140
Cost	<2	3	3.7778	.38490	.22222	2.8216	4.7339
	2-5	12	3.8056	.83434	.24085	3.2754	4.3357
	5-10	22	3.8333	.76808	.16376	3.4928	4.1739
	>10	32	3.7188	.39811	.07038	3.5752	3.8623
	Total	69	3.7729	.61169	.07364	3.6260	3.9199
Knowledge	<2	3	3.0833	.62915	.36324	1.5204	4.6462
	2-5	12	3.3750	.88869	.25654	2.8104	3.9396
	5-10	22	3.2386	.83266	.17752	2.8695	3.6078
	>10	32	3.5000	.65377	.11557	3.2643	3.7357
	Total	69	3.3768	.75199	.09053	3.1962	3.5575
Top Management Support	<2	3	3.4444	.50918	.29397	2.1796	4.7093
	2-5	12	3.5556	.80821	.23331	3.0420	4.0691
	5-10	22	3.3636	.74115	.15801	3.0350	3.6922
	>10	32	3.0833	.82523	.14588	2.7858	3.3809
	Total	69	3.2705	.79269	.09543	3.0801	3.4610
Competitive Advantage	<2	3	3.5556	.50918	.29397	2.2907	4.8204
	2-5	12	3.3611	.64288	.18558	2.9526	3.7696
	5-10	22	3.3939	.71741	.15295	3.0759	3.7120
	>10	32	3.0938	.64610	.11422	2.8608	3.3267
	Total	69	3.2560	.66947	.08059	3.0952	3.4169
Regulatory Support	<2	3	3.8333	.76376	.44096	1.9360	5.7306
	2-5	12	3.2917	1.19579	.34520	2.5319	4.0514

	5-10	22	2.7727	.84130	.17937	2.3997	3.1457
	>10	32	2.8281	.89451	.15813	2.5056	3.1506
	Total	69	2.9348	.95067	.11445	2.7064	3.1632
Adoption	<2	3	3.2667	.11547	.06667	2.9798	3.5535
	2-5	12	3.5500	.63317	.18278	3.1477	3.9523
	5-10	22	3.2909	.59435	.12671	3.0274	3.5544
	>10	32	3.3375	.62721	.11088	3.1114	3.5636
	Total	69	3.3565	.60183	.07245	3.2119	3.5011
Complexity	<2	3	2.3333	1.52753	.88192	-1.4612	6.1279
	2-5	12	2.8056	1.05848	.30556	2.1330	3.4781
	5-10	22	2.6818	.70881	.15112	2.3676	2.9961
	>10	32	2.5833	.82523	.14588	2.2858	2.8809
	Total	69	2.6425	.85237	.10261	2.4378	2.8473
Trialability	<2	3	4.1111	.83887	.48432	2.0272	6.1950
	2-5	12	3.6667	.68165	.19678	3.2336	4.0998
	5-10	22	3.3485	.66251	.14125	3.0547	3.6422
	>10	32	3.3646	.62424	.11035	3.1395	3.5896
	Total	69	3.4444	.66585	.08016	3.2845	3.6044
Organization Readiness	<2	3	3.1667	.28868	.16667	2.4496	3.8838
	2-5	12	3.5000	.97701	.28204	2.8792	4.1208
	5-10	22	3.2955	.93426	.19918	2.8812	3.7097
	>10	32	3.4375	.70425	.12449	3.1836	3.6914
	Total	69	3.3913	.81290	.09786	3.1960	3.5866
Innovation Level	<2	3	4.0000	.33333	.19245	3.1720	4.8280
	2-5	12	3.6944	.96879	.27967	3.0789	4.3100
	5-10	22	3.5455	.97885	.20869	3.1115	3.9795
	>10	32	3.5625	.66901	.11827	3.3213	3.8037
	Total	69	3.5990	.81566	.09819	3.4031	3.7950
External Support	<2	3	3.5833	.52042	.30046	2.2905	4.8761
	2-5	12	3.6250	.43301	.12500	3.3499	3.9001
	5-10	22	3.2727	.79023	.16848	2.9224	3.6231
	>10	32	3.1328	.62535	.11055	2.9073	3.3583
	Total	69	3.2826	.66685	.08028	3.1224	3.4428

Table (4.19) Descriptive Statistics among Participants according to Position

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Relative Advantage	Manager	29	4.0460	.62503	.11607	3.8082	4.2837
	IT Manager	3	3.9444	.09623	.05556	3.7054	4.1835
	System Engineer	5	3.8000	.60553	.27080	3.0481	4.5519
	Network Engineer	4	4.1250	.49768	.24884	3.3331	4.9169
	Management Employee	15	4.2333	.38214	.09867	4.0217	4.4450
	Telecommunication |Engineer	6	4.0278	.26701	.10901	3.7476	4.3080
	other	7	4.2619	.30211	.11419	3.9825	4.5413
	Total	69	4.0894	.50292	.06054	3.9686	4.2102
Compatibility	Manager	29	3.7862	.67174	.12474	3.5307	4.0417
	IT Manager	3	3.7333	.23094	.13333	3.1596	4.3070
	System Engineer	5	3.4400	.87636	.39192	2.3519	4.5281
	Network Engineer	4	3.6500	.34157	.17078	3.1065	4.1935
	Management Employee	15	3.5600	.38693	.09990	3.3457	3.7743
	Telecommunication |Engineer	6	3.3333	.37238	.15202	2.9425	3.7241
	other	7	3.2286	.72506	.27405	2.5580	3.8991
	Total	69	3.6058	.60291	.07258	3.4610	3.7506
Security	Manager	29	3.6466	.68958	.12805	3.3842	3.9089
	IT Manager	3	2.4167	.38188	.22048	1.4680	3.3653
	System Engineer	5	3.7500	.58630	.26220	3.0220	4.4780
	Network Engineer	4	3.4375	.77392	.38696	2.2060	4.6690
	Management Employee	15	3.7833	.51640	.13333	3.4974	4.0693
	Telecommunication |Engineer	6	3.5000	.38730	.15811	3.0936	3.9064
	other	7	3.0357	.99403	.37571	2.1164	3.9550
	Total	69	3.5435	.70965	.08543	3.3730	3.7140
Cost	Manager	29	3.8621	.63943	.11874	3.6188	4.1053
	IT Manager	3	3.5556	.38490	.22222	2.5994	4.5117
	System Engineer	5	4.0667	.36515	.16330	3.6133	4.5201
	Network Engineer	4	3.5000	.43033	.21517	2.8152	4.1848

	Management Employee	15	3.7778	.76290	.19698	3.3553	4.2003
	Telecommunication |Engineer	6	3.6667	.36515	.14907	3.2835	4.0499
	other	7	3.5238	.60422	.22837	2.9650	4.0826
	Total	69	3.7729	.61169	.07364	3.6260	3.9199
Knowledge	Manager	29	3.4741	.84077	.15613	3.1543	3.7940
	IT Manager	3	3.8333	.28868	.16667	3.1162	4.5504
	System Engineer	5	3.7500	.75000	.33541	2.8188	4.6812
	Network Engineer	4	3.2500	.54006	.27003	2.3906	4.1094
	Management Employee	15	3.0500	.79170	.20442	2.6116	3.4884
	Telecommunication |Engineer	6	3.0417	.55715	.22746	2.4570	3.6264
	other	7	3.5714	.37401	.14136	3.2255	3.9173
	Total	69	3.3768	.75199	.09053	3.1962	3.5575
Top Management Support	Manager	29	3.2759	.84077	.15613	2.9560	3.5957
	IT Manager	3	2.5556	.50918	.29397	1.2907	3.8204
	System Engineer	5	3.6000	.79582	.35590	2.6119	4.5881
	Network Engineer	4	2.8333	.57735	.28868	1.9146	3.7520
	Management Employee	15	3.4444	.80343	.20745	2.9995	3.8894
	Telecommunication |Engineer	6	3.3889	.61162	.24969	2.7470	4.0307
	other	7	3.0952	.85449	.32297	2.3050	3.8855
	Total	69	3.2705	.79269	.09543	3.0801	3.4610
Competitive Advantage	Manager	29	3.4023	.72582	.13478	3.1262	3.6784
	IT Manager	3	3.2222	.83887	.48432	1.1384	5.3061
	System Engineer	5	3.4667	.69121	.30912	2.6084	4.3249
	Network Engineer	4	3.1667	.33333	.16667	2.6363	3.6971
	Management Employee	15	3.1778	.58914	.15212	2.8515	3.5040
	Telecommunication |Engineer	6	3.1667	.62361	.25459	2.5122	3.8211
	other	7	2.8095	.69007	.26082	2.1713	3.4477
	Total	69	3.2560	.66947	.08059	3.0952	3.4169
Organizational Support	Manager	29	2.8793	.97884	.18177	2.5070	3.2516
	IT Manager	3	2.1667	1.25831	.72648	-.9591	5.2925
	System Engineer	5	2.8000	1.25499	.56125	1.2417	4.3583
	Network Engineer	4	3.3750	.75000	.37500	2.1816	4.5684
	Management Employee	15	3.1667	.85912	.22183	2.6909	3.6424
	Telecommunication |Engineer	6	2.8333	.40825	.16667	2.4049	3.2618
	other	7	2.9286	1.20515	.45550	1.8140	4.0431
	Total	69	2.9348	.95067	.11445	2.7064	3.1632

Adoption	Manager	29	3.3655	.69912	.12982	3.0996	3.6314
	IT Manager	3	3.2667	.50332	.29059	2.0163	4.5170
	System Engineer	5	3.2800	.86718	.38781	2.2033	4.3567
	Network Engineer	4	3.4500	.41231	.20616	2.7939	4.1061
	Management Employee	15	3.4000	.53984	.13939	3.1010	3.6990
	Telecommunication |Engineer	6	3.5667	.38816	.15846	3.1593	3.9740
	other	7	3.0857	.44508	.16822	2.6741	3.4973
	Total	69	3.3565	.60183	.07245	3.2119	3.5011
Complexity	Manager	29	2.7471	.87585	.16264	2.4140	3.0803
	IT Manager	3	2.7778	1.07152	.61864	.1160	5.4396
	System Engineer	5	3.0000	1.00000	.44721	1.7583	4.2417
	Network Engineer	4	2.0833	.83333	.41667	.7573	3.4094
	Management Employee	15	2.8444	.90735	.23428	2.3420	3.3469
	Telecommunication |Engineer	6	2.1667	.58689	.23960	1.5508	2.7826
	other	7	2.1905	.32530	.12295	1.8896	2.4913
	Total	69	2.6425	.85237	.10261	2.4378	2.8473
Trialability	Manager	29	3.3218	.59417	.11033	3.0958	3.5478
	IT Manager	3	3.0000	.88192	.50918	.8092	5.1908
	System Engineer	5	3.6000	.86281	.38586	2.5287	4.6713
	Network Engineer	4	4.2500	.50000	.25000	3.4544	5.0456
	Management Employee	15	3.4000	.71492	.18459	3.0041	3.7959
	Telecommunication |Engineer	6	3.6111	.38968	.15909	3.2022	4.0201
	other	7	3.5238	.71640	.27077	2.8613	4.1864
	Total	69	3.4444	.66585	.08016	3.2845	3.6044
Organization Readiness	Manager	29	3.6034	.72431	.13450	3.3279	3.8790
	IT Manager	3	2.1667	.28868	.16667	1.4496	2.8838
	System Engineer	5	3.3000	.90830	.40620	2.1722	4.4278
	Network Engineer	4	3.3750	.47871	.23936	2.6133	4.1367
	Management Employee	15	3.5000	.88641	.22887	3.0091	3.9909
	Telecommunication |Engineer	6	3.4167	.37639	.15366	3.0217	3.8117
	other	7	2.8571	1.02933	.38905	1.9052	3.8091
	Total	69	3.3913	.81290	.09786	3.1960	3.5866
Innovation Level	Manager	29	3.7586	.70089	.13015	3.4920	4.0252
	IT Manager	3	2.3333	1.15470	.66667	-.5351	5.2018
	System Engineer	5	3.6667	.62361	.27889	2.8924	4.4410
	Network Engineer	4	3.7500	.56928	.28464	2.8442	4.6558
	Management Employee	15	3.5778	.81130	.20948	3.1285	4.0271

	Telecommunication |Engineer	6	3.3333	.51640	.21082	2.7914	3.8753
	other	7	3.6190	1.26825	.47935	2.4461	4.7920
	Total	69	3.5990	.81566	.09819	3.4031	3.7950
External Support	Manager	29	3.3190	.67114	.12463	3.0637	3.5743
	IT Manager	3	2.4167	.28868	.16667	1.6996	3.1338
	System Engineer	5	3.3500	.78262	.35000	2.3782	4.3218
	Network Engineer	4	3.1875	.37500	.18750	2.5908	3.7842
	Management Employee	15	3.3833	.74322	.19190	2.9717	3.7949
	Telecommunication |Engineer	6	3.4167	.25820	.10541	3.1457	3.6876
	other	7	3.1786	.79993	.30234	2.4388	3.9184
	Total	69	3.2826	.66685	.08028	3.1224	3.4428

Table 4-21 LSD test with Position descriptive determinant

Multiple Comparisons					
LSD					
Dependent Variable	(I) Position	(J) Position	Mean Difference (I-J)	Std. Error	Sig.
Compatibility	Manager	IT Manager	.10952	.34869	.755
		System Engineer	.40286	.27867	.153
		Network Engineer	.19286	.30681	.532
		Management Employee	.28286	.18366	.129
		Telecommunication |Engineer	.50952	.25822	.053
		other	.74286*	.23011	.002
	IT Manager	Manager	-.10952	.34869	.755
		System Engineer	.29333	.41918	.487
		Network Engineer	.08333	.43839	.850
		Management Employee	.17333	.36302	.635
		Telecommunication |Engineer	.40000	.40587	.328
		other	.63333	.38859	.108
	System Engineer	Manager	-.40286	.27867	.153
		IT Manager	-.29333	.41918	.487
		Network Engineer	-.21000	.38504	.587
		Management Employee	-.12000	.29641	.687
		Telecommunication |Engineer	.10667	.34757	.760
		other	.34000	.32722	.303
	Network Engineer	Manager	-.19286	.30681	.532
		IT Manager	-.08333	.43839	.850
		System Engineer	.21000	.38504	.587
		Management Employee	.09000	.32300	.781
		Telecommunication |Engineer	.31667	.37051	.396
		other	.55000	.35149	.123
	Management Employee	Manager	-.28286	.18366	.129
		IT Manager	-.17333	.36302	.635
		System Engineer	.12000	.29641	.687
		Network Engineer	-.09000	.32300	.781
		Telecommunication |Engineer	.22667	.27726	.417
		other	.46000	.25129	.072

	Telecommunication |Engineer	Manager	-.50952	.25822	.053
		IT Manager	-.40000	.40587	.328
		System Engineer	-.10667	.34757	.760
		Network Engineer	-.31667	.37051	.396
		Management Employee	-.22667	.27726	.417
		other	.23333	.30999	.454
	other	Manager	-.74286*	.23011	.002
		IT Manager	-.63333	.38859	.108
		System Engineer	-.34000	.32722	.303
		Network Engineer	-.55000	.35149	.123
		Management Employee	-.46000	.25129	.072
		Telecommunication |Engineer	-.23333	.30999	.454
Security	Manager	IT Manager	1.27976*	.39120	.002
		System Engineer	-.05357	.31264	.865
		Network Engineer	.25893	.34421	.455
		Management Employee	-.08690	.20605	.675
		Telecommunication |Engineer	.19643	.28970	.500
		other	.75893*	.25816	.005
	IT Manager	Manager	-1.27976*	.39120	.002
		System Engineer	-1.33333*	.47028	.006
		Network Engineer	-1.02083*	.49183	.042
		Management Employee	-1.36667*	.40727	.001
		Telecommunication |Engineer	-1.08333*	.45535	.020
		other	-.52083	.43596	.237
	System Engineer	Manager	.05357	.31264	.865
		IT Manager	1.33333*	.47028	.006
		Network Engineer	.31250	.43198	.472
		Management Employee	-.03333	.33254	.920
		Telecommunication |Engineer	.25000	.38994	.524
		other	.81250*	.36711	.031
	Network Engineer	Manager	-.25893	.34421	.455
		IT Manager	1.02083*	.49183	.042
		System Engineer	-.31250	.43198	.472
		Management Employee	-.34583	.36238	.344
		Telecommunication |Engineer	-.06250	.41567	.881
		other	.50000	.39434	.210

	Management Employee	Manager	.08690	.20605	.675
		IT Manager	1.36667*	.40727	.001
		System Engineer	.03333	.33254	.920
		Network Engineer	.34583	.36238	.344
		Telecommunication |Engineer	.28333	.31106	.366
		other	.84583*	.28192	.004
	Telecommunication |Engineer	Manager	-.19643	.28970	.500
		IT Manager	1.08333*	.45535	.020
		System Engineer	-.25000	.38994	.524
		Network Engineer	.06250	.41567	.881
		Management Employee	-.28333	.31106	.366
		other	.56250	.34778	.111
	other	Manager	-.75893*	.25816	.005
		IT Manager	.52083	.43596	.237
		System Engineer	-.81250*	.36711	.031
		Network Engineer	-.50000	.39434	.210
		Management Employee	-.84583*	.28192	.004
		Telecommunication |Engineer	-.56250	.34778	.111
Top Management Support	Manager	IT Manager	.80159	.47315	.095
		System Engineer	-.24286	.37814	.523
		Network Engineer	.52381	.41632	.213
		Management Employee	-.08730	.24921	.727
		Telecommunication |Engineer	-.03175	.35038	.928
		other	.52381	.31224	.098
	IT Manager	Manager	-.80159	.47315	.095
		System Engineer	-1.04444	.56879	.071
		Network Engineer	-.27778	.59486	.642
		Management Employee	-.88889	.49259	.076
		Telecommunication |Engineer	-.83333	.55073	.135
		other	-.27778	.52729	.600
	System Engineer	Manager	.24286	.37814	.523
		IT Manager	1.04444	.56879	.071
		Network Engineer	.76667	.52247	.147
		Management Employee	.15556	.40220	.700
		Telecommunication |Engineer	.21111	.47162	.656
		other	.76667	.44402	.089
	Network Engineer	Manager	-.52381	.41632	.213

		IT Manager	.27778	.59486	.642
		System Engineer	-.76667	.52247	.147
		Management Employee	-.61111	.43829	.168
		Telecommunication |Engineer	-.55556	.50275	.273
		other	.00000	.47695	1.000
	Management Employee	Manager	.08730	.24921	.727
		IT Manager	.88889	.49259	.076
		System Engineer	-.15556	.40220	.700
		Network Engineer	.61111	.43829	.168
		Telecommunication |Engineer	.05556	.37622	.883
		other	.61111	.34098	.078
	Telecommunication |Engineer	Manager	.03175	.35038	.928
		IT Manager	.83333	.55073	.135
		System Engineer	-.21111	.47162	.656
		Network Engineer	.55556	.50275	.273
		Management Employee	-.05556	.37622	.883
		other	.55556	.42063	.191
	other	Manager	-.52381	.31224	.098
		IT Manager	.27778	.52729	.600
		System Engineer	-.76667	.44402	.089
		Network Engineer	.00000	.47695	1.000
		Management Employee	-.61111	.34098	.078
		Telecommunication |Engineer	-.55556	.42063	.191
Organization Readiness	Manager	IT Manager	1.42262*	.47490	.004
		System Engineer	.28929	.37954	.449
		Network Engineer	.21429	.41786	.610
		Management Employee	.08929	.25013	.722
		Telecommunication |Engineer	.17262	.35168	.625
		other	.58929	.31339	.065
	IT Manager	Manager	-1.42262*	.47490	.004
		System Engineer	-1.13333	.57090	.052
		Network Engineer	-1.20833*	.59706	.047
		Management Employee	-1.33333*	.49442	.009
		Telecommunication |Engineer	-1.25000*	.55277	.027
		other	-.83333	.52924	.120
	System Engineer	Manager	-.28929	.37954	.449
		IT Manager	1.13333	.57090	.052

		Network Engineer	-.07500	.52441	.887
		Management Employee	-.20000	.40369	.622
		Telecommunication |Engineer	-.11667	.47337	.806
		other	.30000	.44566	.503
	Network Engineer	Manager	-.21429	.41786	.610
		IT Manager	1.20833*	.59706	.047
		System Engineer	.07500	.52441	.887
		Management Employee	-.12500	.43991	.777
		Telecommunication |Engineer	-.04167	.50461	.934
		other	.37500	.47872	.436
	Management Employee	Manager	-.08929	.25013	.722
		IT Manager	1.33333*	.49442	.009
		System Engineer	.20000	.40369	.622
		Network Engineer	.12500	.43991	.777
		Telecommunication |Engineer	.08333	.37762	.826
		other	.50000	.34224	.149
	Telecommunication |Engineer	Manager	-.17262	.35168	.625
		IT Manager	1.25000*	.55277	.027
		System Engineer	.11667	.47337	.806
		Network Engineer	.04167	.50461	.934
		Management Employee	-.08333	.37762	.826
		other	.41667	.42219	.328
	other	Manager	-.58929	.31339	.065
		IT Manager	.83333	.52924	.120
		System Engineer	-.30000	.44566	.503
		Network Engineer	-.37500	.47872	.436
		Management Employee	-.50000	.34224	.149
		Telecommunication |Engineer	-.41667	.42219	.328

*. The mean difference is significant at the 0.05 level.

جامعة النجاح الوطنية
كلية الدراسات العليا

إطار عمل لتبني الحوسبة السحابية في وزارة الاتصالات وتكنولوجيا المعلومات الفلسطينية

إعداد
محمود فارس يونس

إشراف
د. رامز عساف

قدمت هذه الأطروحة استكمالا لمتطلبات الحصول على درجة الماجستير في الإدارة الهندسية بكلية الدراسات العليا في جامعة النجاح الوطنية في نابلس، فلسطين.
2017

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الملخص

تهدف هذه الدراسة إلى تحديد العوامل التي تؤثر في تبني الحوسبة السحابية في وزارة الاتصالات وتكنولوجيا المعلومات في فلسطين من وجهة نظر الموظفين في الوزارة, وفحص اطار عمل شامل للتحقق من العوامل الرئيسية التي قد تؤثر على تبني هذه التكنولوجيا . وذلك بالاعتماد على اطارين عمل رئيسيين وهما : اطار التكنولوجيا والمنظمة والبيئة المحيطة TOE والاطار الثاني اطار انتشار المبتكراتDOI.

ومن اجل استخدام ودراسة هذين الاطارين تم وضع تصور عن طريق الدراسات الادبية السابقة والاستعانة بآراء الخبراء في عملية تصميم الاستبيان ومدى ارتباطه مع الواقع الفلسطيني كحالة دراسية خاصة, مستعينا بالعوامل الهامة التي يتكون منها الاطارين.

استخدم الباحث المنهج الكمي وذلك للاجابة على اسئلة البحث الرئيسية واختبار فرضيات البحث. ومن اجل فحص العوامل الاساسية لهذين الاطارين تم انشاء وتصميم استبيان وتوزيعه على الفئة المستهدفة. تم تعبئة 69 استبيان بشكل كامل من قبل المستجيبين من صل 75 استبيان تم نوزيعها. ايضا من اجل التأكد من صلاحية الاستبيان تم فحصه من قبل اكاديميين اثنين يحملون شهادة الدكتوراة وعرضه على خبراء من شركات لها علاقة, ومن اجل فحص الاعتمادية تم استخدام فحص كرونباخ والذي كان درجته جيد جدا.

يظهر في تحليل الاستبانة قبول بعض الفرضيات ورفض البعض وعددها 13 فرضية, حيث ان العوامل التي تم قبولها هي : التوافقية, الامن, الدعم القانوني, دعم الادارة العليا, الميزة التنافسية,

درجة التعقيد, التدريب, المعرفة الدعم الخارجي. اما العوامل التي رفضت هي: التكلفة, مزايا الحوسبة السحابية, الجاهزية التنظيمية, مستوى الابتكار.

بالاضافة الى استخدام الانحدارالخطي لاختبار فرضيات البحث والخروج بنتائج التبني للحوسبة السحابية في وزارة الاتصالات الفلسطينية وتقديم التوصيات والمقترحات اللازمة لاخذ عين الاعتبار بها عند تطوير اطار عمل المتعلق بذلك.

بالاعتماد على نتائج البحث يجب على الوزارة العمل على تعزيز تبني الحوسبة السحابية في فلسطين وتقبلها كأداة رئيسية لتطوير بيئة العمل وكذلك البنية التحتية التكنولوجية لتقديم خدمات حوسبة سحابية ذات جودة عالية وتكلفة قليلة, والتنسيق مع المؤسسات العامة والخاصة في تطبيقها من اجل السير قدما نحو التطور المتجه عالميا متماشيا مع الخطة الاستراتيجية لتحقيق اهداف الوزارة.