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The Impact of Cloud Computing Involvement on Competitive Advantage

أثر مساهمة الحوسبة السحابية على المزايا التنافسية

Prepared by:

Suliman Mahmoud Asha

Supervised by:

Dr. Hesham Said Abusaimeh

Thesis Submitted as Partial Fulfillment of the Requirements for Master Degree in Cloud Computing Services and Security

Department of Computer Science

Faculty of Information Technology

Middle East University

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Authorization

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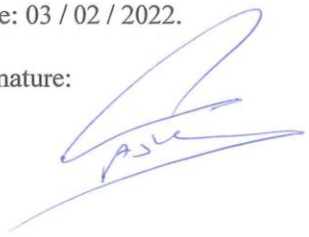

Examination Committee's Decision

This thesis of the student Suliman Mahmoud Asha, which study "**The Impact of Cloud Computing Involvement on Competitive Advantage**" has been defined, accepted, and approved on: 03/02/2022.

Committee Members:

No.	Name	Title	Signature
1	Dr. Hesham Said Abusaimeh	Supervisor	
2	Dr. Abdel-Aziz Ahmad Sharabati	Committee President	
3	Dr. Bassam Ahmad Al-Shargabi	Committee Member	
5	Prof. Mohammad Abdullah Skokani	External member Applied Science University	

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Suliman Mahmoud Asha

Dedication

I dedicate this effort work to my lovely family and friends, and for anyone who has a passion for future work and this dedication will motivate him /her to start on, since always there are people around us for support.

Suliman Mahmoud Asha

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The Impact of Cloud Computing Involvement on Competitive Advantages

Prepared by: Suliman Mahmoud Asha

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Abstract

Purpose: This study aims to investigate the impact of Cloud Computing on the Competitive Advantages of Jordanian Commercial organizations.

Design/Methodology/Approach: To actualize this study the data was collected from 102 managers and owners who are working at Jordanian commercial organizations that use cloud computing services by questionnaire. After confirming the normality, validity and reliability of the tool, descriptive analysis was carried out, and correlation between variables was checked. Finally, the impact was tested by multiple regressions.

Findings: The result shows that the Jordanian commercial organizations implement both Cloud Computing and Competitive Advantages dimensions. It also shows that there is astrong correlation between Competitive Advantages dimensions, and there is a strong relationship between cloud computing and competitive advantage. Finally, it shows that there is a significant and positive impact of cloud computing on Competitive Advantages of Jordanian commercial organizations, where cost was having the highest impact on Competitive Advantages, then quality, while responsiveness, reliability, and innovation do not show a significant impact on total Competitive Advantages.

Limitations/Recommendations: The current study was conducted on Jordanian commercial organizations. Therefore, it recommends that future researchers collect more data over a longer time to check the current model validity and measuring instrument. It also recommends carrying out similar studies outside Jordan to test the generalizability of its results.

Keywords: Cloud Computing, Competitive Advantages, Cost, Quality, Responsiveness, Reliability, Innovation, Jordanian Commercial Organizations.

أثر مساهمة الحوسبة السحابية على المزايا التنافسية

إعداد:

سليمان محمود عشا

إشراف:

الدكتور هشام سعيد أبو صايمة

الملخّص

الغرض: تهدف هذه الدراسة الى معرفة تأثير الحوسبة السحابية على المزايا التنافسية للمؤسسات التجارية الاردنية.

التصميم/الاجراءات: لتحقيق هذه الدراسة تم جمع البيانات من 102 شخص من المديرين والمالكين العاملين في المؤسسات التجارية الأردنية وتستخدم خدمات الحوسبة السحابية عن طريق الاستبيان. بعد التأكد من الحالة الطبيعية للأداة وصحتها وموثوقيتها، تم إجراء التحليل الوصفي، والتحقق من الارتباط بين المتغيرات. وفي النهاية، تم اختبار التأثير من خلال الانحدارات المتعددة.

النتائج: تظهر النتيجة أن المؤسسات التجارية الأردنية تطبق كلي أبعاد الحوسبة السحابية والمزايا التنافسية. كما يوضح أن هناك علاقة قوية بين أبعاد المزايا التنافسية، وهناك علاقة قوية بين الحوسبة السحابية والميزة التنافسية. أخيرًا، يُظهر أن هناك تأثيرًا مهمًا وإيجابيًا للحوسبة السحابية على المزايا التنافسية للمنظمات التجارية الأردنية، حيث كان للتكلفة التأثير الأكبر على المزايا التنافسية، ثم الجودة، بينما لا تظهر أبعاد الاستجابة والموثوقية والابتكار تأثيرًا كبيرًا على إجمالي المزايا التنافسية.

المحددات/التوصيات: أجريت الدراسة الحالية على المنظمات التجارية الأردنية. لذلك، توصي الأبحاث المستقبلية بجمع المزيد من البيانات على مدى وقت أطول للتحقق من صلاحية النموذج الحالي وأداة القياس. كما توصي بإجراء دراسات مماثلة خارج الأردن لاختبار قابلية تعميم نتائجها.

الكلمات المفتاحية: الحوسبة السحابية، المزايا التنافسية، التكلفة، الجودة، الاستجابة، الموثوقية، الابتكار، المؤسسات التجارية الاردنية.

Chapter ONE
Introduction

1.1. Background

Cloud brings broad and far-reaching benefits; in that, it is not just a technical solution or a form of digital transformation that improves the implementation of a server that is stored in another location, but rather the business, has the advantage of reducing the cost of the infrastructure Positively affects the business and is the most important of all, thus reducing dependence on people's skills and human capital.

Hameed (2019) identified several advantages of cloud computing that were embodied in as Cost optimization Customer carry as cloud computing only costs the part that is used rather than purchasing or renting equipment and is much faster than most in-house IT functions (server processing, data storage). It also saves effort and time in managing technology, as it allows an organization to focus more on its core objectives, rather than owning and operating technology capabilities, which are time-consuming, and rely on most cloud services on a consolidated basis. Moreover, Babcock (2015) mentioned that cloud computing provides communication service for organizations, and cloud service providers can guarantee high-quality service delivery, as agreed in the service level agreement between the provider and organization, in addition, to providing data monitoring and protection services that are in line with the requirements of the beneficiary. Furthermore, Basilier, et. al. (2014) described that small and medium organizations are among the most beneficiaries of this technology, as well as large organizations because they can work with the Sourcing Out system, and this allows efficiency and effectiveness in using the infrastructure, and thus the possibility of directing excess labor to work creatively to the possibility of dealing with new technology.

Based on the above discussion which indicates that cloud computing affects organizational competitive advantage, therefore this study investigates the effect of cloud computing on competitive advantage.

1.2. Study Purpose and Objectives

The research aims to study the effect of cloud computing on the competitive advantage of Jordanian commercial organizations, through:

1.2.1. Checking the level of cloud computing implementation in Jordanian commercial organizations.

1.2.2. Checking the level of competitive advantage implementation in Jordanian commercial organizations

1.2.3. Finding the relationship between could computing and the competitive advantage of Jordanian commercial organizations

1.2.4. Finding the effect of could computing and competitive advantage of Jordanian commercial organizations

Moreover, its objective is to:

1. Providing a theoretical framework on the impact of cloud computing on the competitive advantages that will support academics and research on cloud computing.
2. Assessment of the level of spread of cloud computing in Jordanian commercial enterprises.
3. Raising the level of awareness for spreading cloud computing in Jordanian commercial establishments.
4. To make recommendations to managers in commercial enterprises and other related industries, as well as, to decision-makers who are interested in cloud computing in

Jordanian business enterprises and competitive advantages. Furthermore, to submit an additional paper for literature and academic calligraphy.

1.3. Study Significance and Importance

Based on available research, this study may be considered as the first study which tackles the topic of cloud computing and its relationship with a competitive advantage in different commercial types of Jordan organizations.

This study is important to all organizations whatever they do and wherever they perform their business because cloud computing help organizations save time, effort, and cost. Moreover, cloud computing enhances data security, speed, information availability, archiving. Therefore, it is important to be implemented in all organizations including commercial organizations working in manufacturing and service industries, as it's important for decision-make related to the use of cloud computing.

Cloud systems are considered one of the most suitable systems for solving problems related to organizations, because cloud systems, in general, provide flexibility and scalability as needed. Therefore, cloud systems are the most flexible among the systems that use the Internet, and their design is more sensitive to data privacy than public cloud systems. Among the most important goals:

1. The services and advantages that cloud systems provide
2. Solutions through which it is possible to improve the performance of the organization that uses it at the lowest costs compared to the expected cost if similar performance is desired using infrastructure applications and special equipment.
3. Work to create competition between the different commercial sectors.

1.4. Problem Statement

The commercial organization are competing to provide better quality of product and/ or service with lowest cost at right time a place, moreover consistent and flexible product and/ or Service with innovative solutions. Managers in these commercial organization believe that cloud computing will help commercial organization to compete in the current market which based on competitive advantage (Cost, Quality, Responsiveness, Reliability, and Innovation).

Chang, et. al. (2018) stated that globalization and the broad scope of the cloud interfered with the effectiveness of the cloud and approached competitive advantages. Nuseibeh (2011) emphasized that organizations need to measure and visualize their cloud computing functions to identify the non-competitive segments, along with developing dynamic strategies and immediately launching necessary improvement actions. Shukla, et. al. (2021) concluded that lack of cloud benchmarking is one of the high factors affecting cloud functionality and there is a need to build a formal performance benchmark tracking system. Zhang, et. al. (2019) highlighted the need for a visualization system to monitor and share information and knowledge about sub-variables within the cloud computing to enable the speed of the process, based on that which increased the requirements of the control tower to measure and visualize daily cloud computing activities and deal with deviations.

Finally, to become an effective player in the business market, executives must find a tool to align and synchronize their cloud computing activities to achieve corporate strategy and competitive advantages.

Therefore the main of this research is to investigate the effect of Cloud Computing on competitive Advantage by answering the following questions:

1. What is the level of implementing cloud computing in Jordanian commercial organizations?
2. What is the level of implementing competitive advantage in Jordanian commercial organizations?
3. What is the level of relationship between cloud computing and the competitive advantage of Jordanian commercial organizations?
4. Does could computing affect competitive advantage dimensions (cost, quality, responsiveness, reliability, and innovation) of Jordanian commercial organizations

The first and second questions will be answered by descriptive analysis, the third question by correlation test, while the fourth question will be answered by the following hypotheses

1.5. Study Hypothesis

Based on the above questions, the fourth question will be answered by testing the following hypothesis:

H_0: Cloud computing does not affect the competitive advantages dimensions (cost, quality, responsiveness, reliability, and innovation) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Based on the dimensions of competitive advantages the following sub-hypothesis is developed:

$H_{0.1}$: Cloud computing does not affect the competitive advantages dimension (cost) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

$H_{0.2}$: Cloud computing does not affect the competitive advantages dimension (quality) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

$H_{0.3}$: Cloud computing does not affect the competitive advantages dimension (responsiveness) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

$H0_{0.4}$: Cloud computing does not affect the competitive advantages dimension (reliability) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

$H_{0.5}$: Cloud computing does not affect the competitive advantages dimension (innovation) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

1.6. Study Model

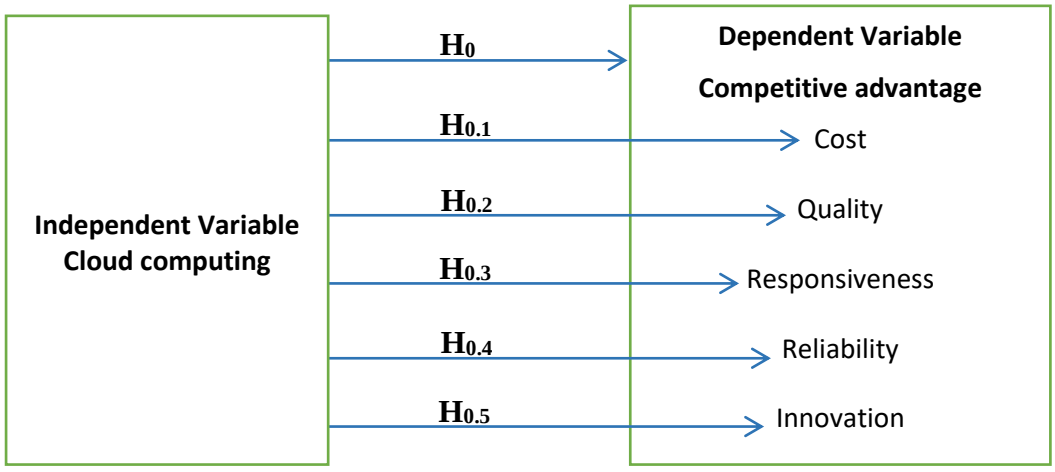

Figure 1: Study Model

Model Sources: Powell (2010), Porter (2000), Sigalas (2015), Ceglinski (2017), Boychev (2004), Ileana et. al. (2020), Chen, et. al. (2016), Mitraa, et. al. (2014), and Trevor (2013).

1.7. Procedural (Operational) Definitions of Terms

Procedural definitions were created based on previous studies the o develop a questionnaire

Cloud Computing: Cloud computing model provides a solid solution and reachable information technology (IT) base to the commercial organizations for growing operations since they get IT infrastructure, platform applications as services.

Competitive Advantages: Competitive advantages are defined as factors that allow commercial organizations to produce services and goods better or cheaper than their rivals and give results that satisfy customers more than among competitors. Competitive advantages are measured by evaluating its components (cost, quality, responsiveness, reliability, and innovation) and each sub-variable is defined as below:

Cost: The cost as a competitive advantage can be defined as the organization producing a product or service at a lower cost without compromising quality.

Quality: Quality is a Competitive Advantages that can be defined as the organization's capabilities to offer a premium product that differentiates itself from rivalries to meet or exceed customers' requirements.

Responsiveness: Responsiveness is the Competitive Advantages that enable the organization to handle changes in customers' demand or requirements. Responsiveness is based on two pillars, the first one is the organization's flexibility to adopt any changes in demand as quantities or requirements, and the second pillar is the organization's speed to fulfill such demand.

Reliability: Reliability is defined as the Competitive Advantages, which gives organizational capability that consistently achieves the task against customers' requirements and needs.

Innovation: The innovation Competitive Advantages is defined as the organizational creativity for introducing, developing, or redesigning their processes, products, and markets in a way that differentiates itself from competitors.

1.8. Study Limitations and Delimitations

Human: this study served only the managers of the organization.

Place: No official sources for Jordanian organizations those use cloud computing.

Time: this study is carried out during December 2021.

Delimitations

The use in Jordan organization limits its generalizability globally, even without selecting a specific section doesn't give the real status for each sector of active organizations therefore, generalizing results may be questionable. Extending the analyses to all sectors and countries represent future research opportunities, which can be done by further testing with larger samples out of Jordan and making specific to of active organization types.

Chapter TWO
Theoretical and Conceptual Framework

2.1 Introduction

This chapter includes a definition of variables, previous studies, and what differentiates this study from previous studies.

2.2 Independent Variable (Cloud Computing)

Dikaiakos, et.al (2009) stated that cloud computing is a disruptive technology with profound implications not only for Internet services but also for the IT sector as a whole. Its emergence promises to streamline the on-demand provisioning of software, hardware, and data as a service, achieving economies of scale in IT solutions' deployment and operation. This issue's articles tackle topics including architecture and management of cloud computing infrastructures, SaaS and IaaS applications, the discovery of services and data in cloud computing infrastructures, and cross-platform interoperability. Armburst, et. al. (2010) stated cloud computing work is the delivery of hosting services that are provided to a client over the Internet.

Although cloud computing is not a new topic, it must be defined according to scientists and researchers. Shivaji, et. al. (2011) said that cloud computing is a large group of interconnected computers, these computers can be personal computers or network servers they could be published public or private. Goundar (2012) defined cloud computing as emailing information to yourself from the office and then retrieving and using that information at home as an example. Most of us are doing that, therefore we are already computing in the cloud

Voytenko, et.al. (2015) mentioned the Cloud computing model and we discuss its application in the form of a prototype for cooperation between academic institutions.

Cloud computing is getting more and more popular nowadays, but many organizations understand cloud computing in different ways. Although almost everyone recognizes the importance of more efficient use of resources and the shift from desktop and mainframe applications to client-server, distributed, multiprocessing, n-tier and network.

Ting, et. al. (2016) said that Cloud Computing is a promising technology. It supports the organization more efficiently and offers a variety of opportunities many organizations working in the traditional ways are unable to compete with their competitors. Especially in this competitive environment and describes acts as an excellent technological tool that helps the organizations to keep competitive it offers organizations more flexibility, scalability, agility, reduces costs, and higher efficiency.

Zhang (2016) added that cloud computing infrastructure is available for private cloud, public cloud, and hybrid cloud systems. It's also possible to rent cloud infrastructure components from a cloud provider, through cloud infrastructure as a service (Iaas). Cloud infrastructure systems allow for integrated hardware and software and can provide a single management platform for multiple clouds

In the end, the cloud computing uses a set of well-known rules in a particular field to solve the problems facing humanity, and these solutions are close to human work, and all modern technology, including the Internet, must be used. In this study cloud computing is defined as the solution by Information Technology (IT) since to commercial organization for having on-demand both computer infrastructure and systems, will measure 15 questions have been designed as the used cases those force or motivate commercial organizations for using IT services.

In short, the cloud computing model provides a solid solution and reachable information technology (IT) base to the commercial organizations for growing operation, since they get IT infrastructure, platform and applications as services.

2.3 Dependent Variable (Competitive Advantage)

There is consensus between the Competitive Advantages concept and definition. Porter's (2000) Competitive strategy is to search for a favorable competitive position in an industry, the primary arena in which competition occurs. The competitive strategy aims to create a profitable enterprise and to stand sustainable against the forces that determine the industry's competition. Sigalas (2015) it can be assumed that managers will not be able to understand and control competition advantages and develop one for their own company based on the study of other competing companies. Managers' empirical awareness regarding the concept of competitive advantage. Paweł (2017) these factors allow the productive entity to generate more sales or superior margins compared to its market rivals.

In short, competitive advantages are defined as factors that allow the commercial organizations to produce services and goods better or cheaper than their rivals and give results that satisfy customers more than among competitors.

Cost

The definition of cost as a Competitive Advantages had a consensus by organizations and scholars. Ting, et.al. (2016) mentioned that he main reason that motivates the organization to adopt cloud computing is cost reduction, which stated that cloud computing has helped the organizations to save a huge cost mainly due to its subscription models up to 45%. The resources on cloud computing can be installed and deployed very quickly. Boychev (2014) stated that reducing IT costs allows

organizations to focus their funds on other tasks or spheres of operation. Thomas, et. al (2016) described that the cost of IT by converting IT investments from capital expenditure to operational expenses improves the end-user experience.

In short, cost as a competitive advantage can be defined as the organization's production of a product or service at a lower cost without compromising quality.

Quality

The definition of cost as a Competitive Advantages had a consensus by researchers and scholars Ting, et.al. (2016) said that there are some risks to organizations as well. To provide a better quality of services, service providers have the responsibility to ensure that the cloud environment is highly secured. Service providers should do enhanced security to gain the trust of users. Frank, et. al. (2012) stated that administrations use the cloud largely in the same ways as businesses, in addition to innovating in the quality of services they provide to citizens through e-government solutions. Ileana, et.al. (2020) mentioned that visualizing cloud computing service quality among small and medium businesses employees. Moreover, the perception of employees regarding satisfaction with the use of cloud computing.

In short, quality is a competitive advantage that can be defined as the capabilities of an organization to offer an outstanding product that differentiates itself from competitors to meet or exceed customer requirements.

Responsiveness

The definition of Responsiveness as a Competitive Advantages had a consensus by researchers and scholars Ting, et.al. (2016) used to respond to rapidly changing customer needs that cloud computing can achieve this in a more efficient way. Due to

the availability of the Internet. Mitraa, et. al. (2014) said that the structures and roles of responders in selected organizations have been most frequently identified by first moving from the abstraction to the use of the cloud. MUTUNGA (2014) stated that while responding to the opportunities and threats in the environment. Competitive advantage is an organization's ability to perform in one or more ways that competitors will not and cannot match.

In short, responsiveness is the competitive advantages that enable an organization that is able to deal with changes in customer demand or requirements. The response is based on two pillars, the first is the organization's flexibility to adopt any changes in demand quantities or requirements, and the second pillar is the organization's speed to meet demand.

Reliability

The definition of Reliability as a Competitive Advantages had a consensus by researchers and scholars. Mohammad, at. el. (2018) stated that delivering highly available and reliable services in the cloud is essential to maintaining customer trust and satisfaction and preventing revenue losses. Thanadech, et. al. (2013) described that the reliability of cloud systems is directly related to their performance. When the system fails, applications running on the cloud can be interrupted. If the system does not have any fault-tolerant mechanisms. Ricardo, et. al. (2015) mentioned that reliability is indeed a challenging task for cloud customers, which can eliminate data leakage provided to the cloud and provide customers' trust. To overcome this challenge, third-party services must be monitored, and companies' performance, strength, and certification must be overseen.

In short, reliability defined as “competitive advantage” is the organizational ability that continually achieves the mission according to customer requirements and needs.

Innovation

There is no well and cut definition for Innovation Competitive Advantages by researches, Jordi (2010) said that cloud computing is able to facilitate innovation in organizations. Focusing on the potential value of cloud computing enterprises, and the introduction of modern innovations and adapting to the market and whether it is linked to the development of the work system of the existing institutions, there must be an incentive for this. Vivek K (2011) described that cloud computing provides government with an opportunity to be more efficient, fast and innovative Through the most effective use of IT investments, and the application of innovations developed in the private sector section. If an agency wants to launch a new innovative program, it can do so quickly by leveraging cloud infrastructure without having to acquire large hardware, reducing time and cost barriers to Designation.

In short, Innovation is a competitive advantage that can be defined as the capabilities of an organization to offer an outstanding product that differentiates itself from competitors to meet or exceed customer requirements.

2.4 Previous Studies

Jeff (2001) study titled: “**Leveraging the Supply Base for Competitive Advantage”. An Applied Study in the Air Transport Services Sector**,” which aimed to determine the relationship between customer satisfaction and competitive advantage. The services provided by Syrian Airlines, and the fact that this institution does not have any significant competitive advantage, the study recommended paying more attention to

customer satisfaction, and subjecting service providers to training courses to improve their abilities and skills.

Subashini and Kavitha. (2010) study titled: **"A survey on security issues in service delivery models of cloud computing"**, Describes various cloud-specific security issues computing due to service delivery models the methodology of studying the model was to be more dynamic and positional in nature. My research questions will focus on the security of applications and data across the cloud, and I intend to develop a framework through which the security methodology varies dynamically from one transaction/connection to another, and the researcher finds the advantages of this technology. This security module must meet all issues arising from all cloud trends. Each component in the cloud must be analyzed at the macro and micro levels the level and integrated solution must be designed and deployed in the cloud to attract and capture potential consumers. Even after that, the cloud environment will still be cloudy.

Thomas (2010) study titled: "**Organizational Alignment as Competitive Advantage**", aimed to identify the competitive environment and its determinants, and to study its impact on the competitive advantage of commercial companies. The results showed that the determinants of the competitive environment affecting the competitive advantage of Jordanian trading companies are (demand conditions, strategy, structuring, competition, and production factors), and the study showed that the most important competitive strategies used in these companies are (cost leadership strategy, differentiation strategy, and focus strategy respectively).

Jordi (2010) study titled: "**Cloud Computing and the Innovation Process of Technology Consulting Services**". The objective of the study explicitly linking management and engineering activities to their business objectives expands the scope of

highlighting the product life cycle and engineering activities. The study methodology contains information for all types of projects, industries, services and solutions. The methodology is based on the best in the world practices, passing through the various stages of the project. The results that the researcher reached were despite the fact that cloud computing is still in the emerging phase; Organizations must take steps now to experiment, learn and get some immediate business benefits. To be successful organizations must take small and incremental steps toward this new environment so that benefits can be obtained early for applicable business cases, and learn to deal with related issues and risks.

Son, et. al. (2011) study titled: "**Understanding The Impact Of IT Service Innovation On Firm Performance: The Case Of Cloud Computing**", The Cloud computing is came as a trend of Information technology (IT) services of organization invocation with other advantage such as cost reduction and flow ability of management as a new paradigm shift of design and deliver that generated significant interest over commercial organization.

Al-Awawdeh and Al-Sharairi (2012) study entitled: "**The Relationship between Target Costing and Competitive Advantage of Jordanian Private Universities**", aimed to try to test the role of information systems in achieving competitive advantage through differentiation strategies and cost leadership, and concluded that there is a strong positive relationship between them, and the study recommended Using training programs to achieve differentiation, and evaluate the relationship between information systems and human resources for the purposes of developing and updating information systems.

Ting, et. al. (2016) study titled: "**Benefits and Challenges of the Adoption of Cloud Computing in Business**". The aim of the study was that cloud computing played a major role in solving the problem of inefficiency in organizations and increasing business growth and thus helping organizations to remain competitive. The methodology was in different types of definitions from different experts in cloud computing. In addition to cloud computing Service and deployment models will be provided to show the characteristics of different models the researcher reached the results represented in the main benefit is that it helps to reduce unnecessary costs such as purchase and maintenance of hardware and software. Besides, the workers who work in the field of information technology are reduced. However, like all other technologies, there are some issues with cloud computing.

Chang, et. al. (2018) study titled: "**The effect of IT ambidexterity and cloud computing absorptive capacity on competitive advantage**", aimed to develop an information technology (IT) ambidexterity framework to underscore the importance of a balanced and harmonious IT environment in enterprise cloud adoption. The data was collected by questionnaire from 165 IT manager who are working on cloud computing and partial least square method used to test the model. Results showed that cloud computing created a competitive advantage. The synergy of cloud computing elements enhances cloud computing capabilities and leads to increase organization's knowledge and performance.

Hasimi, et. al. (2018) study titled: "**Cloud Computing Implementation in the Public Sector: Factors and Impact**", the aim of the study is to establish a framework for implementing cloud computing services and resources in the Malaysian public sector based on the TOE and HOT-fit model. Methodology The selection framework for

this survey included 730 organizations in different ministries, departments and agencies across the country. Stratified sampling techniques used to identify organizations to serve as responders. And the results were. Developed and validated by powerful statistical analytics. Results obtained based on the proposed uptake framework for cloud computing in the Malaysian public sector.

Silvia, et.al. (2018) in his study entitled: "**A Multidimensional Analysis of the Relationship Between Corporate Social Responsibility and Firms' Economic Performance**", his greatest interest was to identify the economic effects of social responsibility, such as cost effectiveness and productivity, and he focused on two factors of social responsibility, namely social and environmental practices. After reviewing some literature and studies, the researchers concluded that social responsibility affects some economic aspects such as efficiency, productivity and costs.

2.5 What Distinguishes the Current Study from Previous Studies?

This study is distinguished from other previous studies by the following:

First: this study examines the behavior of all Jordanian commercial organization types in term of used case of cloud computing, in achieving competitive advantage in the Jordanian commercial sectors using cloud computing because of its importance in improving and developing the internal work environment, and in response to the changes that affect it. Its external environment and competitive advantage sections.

Second: It deals with new dimensions and variables that were not addressed by any of the previous studies within the dimensions cloud computing such as caring for workers and customers, with the aim of measuring their impact on competitive advantage.

Chapter THREE
Study Methodology (Methods and Procedures)

3.1 Introduction

This chapter includes study design, population, sampling, unit of analysis. Moreover, it includes data collection methods and tool, validity and reliability tests. Furthermore, it includes demographic description,

3.2 Study Design

This study uses a quantitative method, where a cross sectional sample collection has been used to investigate the impact of Cloud Computing on Jordanian commercial organization' competitive advantages. The study used a questionnaire as a main tool to collect data, which purposefully developed for this study. After collecting data, it has been checked for suitability, then coded against SPSS 20, and validity, reliability and correlation between variables were confirmed before testing the effect through multiple regressions.

3.3 Study Population, Sample and Unit of Analysis:

Jordan Commercial Organizations are categorized in two groups as the first group called Corporate Companies which has at least fifteen employees and the second group called small and Medium Enterprise (SMES), which has less than fifteen employees. The study targeted the Corporate Companies, which uses cloud computing services and count about 200 Corporate Companies, this negate the need for sampling. The unit of analysis is the manager in theses Corporate Companies.

3.4 Data Collection Methods (Tools)

Two sources have been used to collect the data, secondary and primary sources. Secondary source includes books, thesis, dissertations, articles, journals, and internet. The questionnaire was used to collect the data and used as a primary source.

3.4.1 Study Instrument (Tool)

The questionnaire was the main tool to collect the primary data, which divided into three sections as follows:

First section includes the demographic dimensions related to gender, age, experience, education and position.

Second section includes **Independent variable (Cloud Computing):** it's designed in fifteen questions they cover organization Cloud Computation implementation.

Third section includes **Dependent Variable (Competitive Advantages):** it's designed to measure the five dimensions of competitive advantage (Cost, Quality, Responsiveness, Reliability and Innovation).

All items of independent and dependent variables are measured by five-points as a scale for respondents from 1 to 5 of implementation (Never implemented =1, Slightly implemented =2, Sometimes implemented =3, Almost implemented =4 or Frequently implemented =5).

3.4.2 Data Collection and Analysis:

All Jordan Commercial Organizations (Corporate Companies) were targeted, which uses cloud computing services and count about 200 Corporate Companies, this negate the need for sampling. Therefore, 170 questionnaire were distributed through online,

only 102 questionnaire came back, all of them were suitable for analysis and coded against SPSS 20, then the following tests were carried out>.

Validity Test

The validity of the study tool were checked by three methods: content validity, face validity, and construct validity.

Content validity was confirmed through literature review includes books, thesis, dissertations, articles, journals, and internet. The questionnaire was used to collect the data and used as a primary source. Face validity was confirmed via Referee committee (see Appendix no.1), which included Six academicians and five professionals. Construct validity was confirmed by using factor analysis.

Constract Validity (Factor Analysis)

The construct validity confirmed through using Principal Component Factor Analysis with Kaiser Meyer Olkin (KMO). Principal Factor Analysis is used to confirm the data explanatory and conformity. Factor loading more than 0.50 is good and 0.40 is accepted (Hair, et. al. 2014). Moreover, to check sampling adequacy, harmony and inter-correlations Kaiser Meyer Olkin (KMO) has been used, KMO values between 0.8 and 1 indicate high adequacy, and if it is more than 0.60 is good and accepted. While. Bartlett's of Sphericity indicates data suitability and correlation, when significant value is less than 0.05 at 95% confidence level, indicates useful of factor analysis. Variance shows explanation power of factors (Cerny & Kaiser, 1977).

Cloud Computing

Table (3.1): Principal Component Analysis Cloud Computing

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	The company uses cloud computing to exchange information with partners.	0.808	0.917	1259.896	105	68.475	0.000
2	The company uses cloud computing to facilitate work	0.773					
3	The company synergizes its processes though cloud computing.	0.773					
4	The company uses cloud computing to control operations.	0.870					
5	The company uses cloud computing for continues process improvement.	0.825					
6	The company uses cloud computing to maximize production capacities.	0.797					
7	The company uses cloud computing for distribution network.	0.789					
8	The company uses cloud computing for selecting shipping route.	0.706					
9	The company uses cloud computing for schedules shipments.	0.763					
10	The company uses cloud computing for to reduce risks	0.723					
11	The company uses cloud computing for standardizing procedures	0.776					
12	The company uses cloud computing for monitoring environmental	0.710					
13	The company uses cloud computing for storing data	0.781					
14	The company uses cloud computing for reaching data at any time	0.817					
15	The company uses cloud computing tracks inventory activities	0.732					

Table (3.1) indicates that the loading factor of cloud computing items rated between 0.706 and 0.870. Therefore, the construct validity is confirmed. KMO has rated 91.7%, which indicates homogeneity and good adequacy, and the Chi2 is 1259.896, which

indicates model fitness. So, it explains 68.475% of variation. Finally, the Bartlett's Sphericity significance less than 0.05 indicates the factor analysis is useful.

Competitive Advantage (Cost)

Table (3.2): Principal Component Analysis of Cost

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	The company maximizes production output	0.687	0.715	203.402	10	59.042	0.000
2	The company reduces distribution.	0.808					
3	The company uses less employees.	0.818					
4	The company reduces infrastructure assets.	0.784					
5	The company reduces software licensing.	0.739					

Table (3.2) indicates that the loading factor of Competitive advantage - Cost items rated between 0.687 and 0.818.

Therefore, the construct validity is confirmed. KMO has rated 71.5%, which indicates homogeneity and good adequacy, and the Chi2 is 203.402, which indicates model fitness. So, it explains 59.042% of variation. Finally, the Bartlett's Sphericity significance less than 0.05 indicates the factor analysis is useful.

Competitive Advantage (Quality)

Table (3.3): Principal Component Analysis Quality

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	The company uses standard procedures	0.764	0.856	293.546	10	69.78	0.000
2	The company improves data quality system.	0.871					
3	The company enhances quality control on activities.	0.924					
4	The company shares quality specification with partners.	0.822					
5	The company updates devices continuously.	0.785					

Table (3.3) indicates that the loading factor of Competitive Advantage- Quality items rated between 0.764 and 0.924. Therefore, the construct validity is confirmed. KMO has rated 85.6%, which indicates homogeneity and good adequacy, and the Chi2 is 293.546, which indicates model fitness. So, it explains 69.78% of variation. Finally, the Bartlett's Sphericity significance less than 0.05 indicates the factor analysis is useful.

Competitive Advantage (Responsiveness)

Table (3.4): Principal Component Analysis Responsiveness

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	The company minimizes shipping time.	0.734	0.803	172.42	10	58.909	0.000
2	The company shortens process time.	0.830					
3	The company shortens manufacturing cycle time.	0.795					
4	The company respond to markets changes as fast as possible.	0.778					
5	The company delivers customer orders on time.	0.693					

Table (3.4) indicates that the loading factor of Competitive Advantage – Responsiveness items rated between 0.693 and 0.830. Therefore, the construct validity is confirmed. KMO has rated 80.3%, which indicates homogeneity and good adequacy, and the Chi2 is 172.42, which indicates model fitness. So, it explains 58.909% of variation. Finally, the Bartlett's Sphericity significance less than 0.05 indicates the factor analysis is useful.

Competitive Advantage (Reliability)

Table (3.5): Principal Component Analysis Reliability

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	The company coordinates delivery changes with its customers.	0.789	0.766	180.853	10	58.04	0.000
2	The company responds to sudden orders.	0.839					
3	The company develops flexible processes.	0.783					
4	The company responds to various orders.	0.703					
5	The company adapts big data analysis.	0.685					

Table (3.5) indicates that the loading factor of Competitive Advantage - Reliability items rated between 0.685 and 0.839. Therefore, the construct validity is confirmed. KMO has rated 76.6%, which indicates homogeneity and good adequacy, and the Chi2 is 180.853, which indicates model fitness. So it explains 58.04% of variation. Finally, the Bartlett's Sphericity significance less than 0.05 indicates the factor analysis is useful.

Competitive Advantage (Innovation)

Table (3.6): Principal Component Analysis Innovation

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	The company encourages creative ideas.	0.828	0.867	281.294	10	69.677	0.000
2	The company develops creative solutions for problems.	0.873					
3	The company uses customers' complaints to improve its activities.	0.744					
4	The company implement new ideas continuously.	0.892					
5	The company adopts new technologies within its processes.	0.83					

Table (3.6) indicates that the loading factor of Competitive Advantage - Innoviation items rated between 0.744 and 0.892. Therefore, the construct validity is confirmed.

KMO has rated 86.7%, which indicates homogeneity and good adequacy, and the Chi2 is 281.294, which indicates model fitness. So it explains 69.677% of variation. Finally, the Bartlett's Sphericity significance less than 0.05 indicates the factor analysis is useful.

Competitive Advantage Dimensions

Table (3.7): Principal Component Analysis Variables of Competitive Advantages

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	Cost	0.761	0.834	308.97	10	70.977	0.000
2	Quality	0.849					
3	Responsiveness	0.869					
4	Reliability	0.872					
5	Innovation	0.857					

Table (3.7) indicates that the loading factor of Competitive Advantage - Dimensions items rated between 0.761 and 0.872. Therefore, the construct validity is confirmed. KMO has rated 83.4%, which indicates homogeneity and good adequacy, and the Chi2 is 308.97, which indicates model fitness. So it explains 70.977% of variation. Finally, the Bartlett's Sphericity significance less than 0.05 indicates the factor analysis is useful.

Reliability Test

Cronbach’s alpha has been used to test the tool reliability. Cronbach’s alpha value less than 50 is not accepted, between 50 and 60 is poor, 60 and 70 is good, more than 70 is acceptable (Hair, et. al. 2014). Table (3.8) shows that reliability coefficient for all variables and sub-variables are more than 0.80. Independent variable Cloud Computing is 0.952, and the grouping variables of Independent Competitive Advantages (Cost, Quality, Responsiveness, Reliability and Innovation) is ranked as 0.895 and the separate rank for each variable of Competitive Advantages is between 0.813 and 0.890.

Table (3.8): Reliability Test for all Variables

Variable	Items Count	Cronbach's Alpha
Dependent - Cloud Computing	15	0.952
Independent - Competitive Advantages All	5	0.895
Competitive Advantages - Cost	5	0.824
Competitive Advantages - Quality	5	0.890
Competitive Advantages - Responsiveness	5	0.823
Competitive Advantages - Reliability	5	0.813
Competitive Advantages - Innovation	5	0.890

3.4.3. Demographic Analysis:

The demographic analysis includes frequency and percentage of samples such as gender, age, Experience, education, Position and division.

Gender: Table (3.9) shows that only 23.5% of respondents are Female, and the rest majority 76.5% are male as their count is 78 out total respondent 102 employees, this is justified since the female's proportion is low within the scope of tested organizations.

Table (3.9): Respondents Gender

Gender	Frequency	Percent
Male	78	76.5%
Female	24	23.5%
Total	102	100%

Age: Table (3.10) shows that employees in the age bracket of 30 to 39 years are the majority count percentage of respondents which equal to 49% with count 50 employees, and the distribution of rest age brackets are, starting from second biggest position 31.4% of respondents between 40 to 49 years, in the third position 18.6% are less than 30 years and one employee as over than or equal 50 years.

Table (3.10): Respondents Age

Age	Frequency	Percent
Less than 30	19	18.6%
Bet. 30-39	50	49%
Bet. 40-49	32	31.4%
More or equal 50	1	1%
Total	102	100%

Experience: Table (3.11) shows that most of the respondents have experience between 10 to 20 years as 54.9% with count 56 employees, and the brackets distribution for rest are, in the second position 26.5% have less 10 years' experience, the third position is between 21 to 30 years as 16.7% and 2% have over than or equal 30 years of experience.

Table (3.11): Respondents Experience

Experience	Frequency	Percent
Less Than 10	27	26.5%
Bet. 10-20	56	54.9%
Bet. 21-30	17	16.7%
More Than 30	2	2%
Total	102	100%

Education: Table (3.12) shows that most respondents 68.6% have a Bachelor with count 70 employees, 17.6% have master's degree, 7.8% have Diploma and 5.9% have Ph.D.

Table (3.12): Respondents Education

Education	Frequency	Percent
Diploma	8	7.8%
Bachelor	70	68.6%
Master	18	17.6%
Ph.D.	6	5.9%
Total	102	100%

Position: Table (3.13) shows that most respondents are managers 46.1% with count 47 employees, 45.1% are supervisors and 8.8% are organization managers or owners.

Table (3.13): Respondents Position

Position	Frequency	Percent
Supervisor	46	45.1%
Manager	47	46.1%
G.M/Owner	9	8.8%
Total	102	100%

Chapter FOUR
Data Analysis

4.1. Introduction

This chapter includes data descriptive statistical analysis of respondents' perception, Pearson Bivariate Correlation matrix to test the relationships among Competitive Advantages dimensions, and between Cloud Computing with Competitive Advantages dimensions. Finally, multiple regressions to test hypothesis: the impact of Cloud Computing on Jordanian commercial organizations' competitive advantage.

4.2. Descriptive Statistical Analysis

Descriptive statistical analysis includes the mean, standard deviation, t-value, ranking and implementation level for each dimension and item are used to answer first and second questions:

What is the level of implementing cloud computing in Jordanian commercial organizations?

What is the level of implementing competitive advantage in Jordanian commercial organizations?

The implementation level is divided into three categories based on the following formula:

$$\frac{5-1}{3} = 1.33$$

Therefore, between 1.00 and 2.33 indicates low implementation, between 2.34 and 3.66 indicates medium implementation, and between 3.67-5.00 indicates high implementation.

Independent Variable (cloud Computing)

Table (4.1): Mean, Standard Deviation, t-value, Ranking and Implementation Level of cloud computing

NO.	Item	Mean	S. D.	t	Sig.	Rank	Imp.
1	The company uses cloud computing to exchange information with partners.	3.39	1.204	3.291	.001	11	Medium
2	The company uses cloud computing to facilitate work	3.52	1.167	4.498	.000	4	Medium
3	The company synergizes its processes though cloud computing.	3.38	1.259	3.067	.003	9	Medium
4	The company uses cloud computing to control operations.	3.52	1.241	4.230	.000	5	Medium
5	The company uses cloud computing for continues process improvement.	3.43	1.301	3.348	.001	8	Medium
6	The company uses cloud computing to maximize production capacities.	3.47	1.426	3.333	.001	7	Medium
7	The company uses cloud computing for distribution network.	3.51	1.333	3.862	.000	6	Medium
8	The company uses cloud computing for selecting shipping route.	3.06	1.356	.438	.662	14	Medium
9	The company uses cloud computing for schedules shipments.	3.13	1.376	.935	.352	13	Medium
10	The company uses cloud computing for to reduce risks	3.56	1.239	4.554	.000	3	Medium
11	The company uses cloud computing for standardizing procedures	3.56	1.207	4.676	.000	3	Medium
12	The company uses cloud computing for monitoring environmental	3.25	1.338	1.850	.067	12	Medium
13	The company uses cloud computing for storing data	3.81	1.311	6.271	.000	2	High
14	The company uses cloud computing for reaching data at any time	3.83	1.251	6.725	.000	1	High
15	The company uses cloud computing tracks inventory activities	3.34	1.247	2.780	.006	10	Medium
	Cloud Computing	**3.451**	**0.996**	**4.572**	**.000**		**Medium**

T-tabulated=1.980

Table (4.1) shows that the means of the cloud computing items between 3.06 to 3.83 with a standard deviation range from 1.167 and 1.426. This indicates that

respondents semi-agree on medium to high implementation of the cloud computing Items. While the average mean is 3.451 with a standard deviation of 0.996, indicating that cloud computing is medium implemented, where t-value=4.572 is more than T-tabulated=1.980.

Dependent variable (Competitive Advantages)

Table (4.2): Mean, Standard Deviation, t-value, Ranking and Implementation Level of Competitive Advantages Dimensions

No.	Variables	Mean	S.D.	t	Sig	Rank	Imp
1	Cost	3.269	.951	2.852	.005	5	Medium
2	Quality	3.700	.956	7.399	.000	3	High
3	Responsiveness	3.596	.879	6.847	.000	4	Medium
4	Reliability	3.703	.830	8.570	.000	2	High
5	Innovation	3.827	.875	9.486	.000	1	High
	Competitive Advantage	**3.618**	**.755**	**8.270**	**.000**		**Medium**

T-tabulated=1.980

Table (4.2) shows that the means of the competitive advantage dimensions between 3.269 to 3.827 with a standard deviation range from 0.830 and 0.956, indicating that the respondents agree on medium to high implementation of competitive advantage sub-variables. While the average mean is 3.618 with a standard deviation of 0.755, indicating that cloud computing is medium implemented, where t-value=8.270 is more than T-tabulated=1.980. The innovation rated the highest implementation, followed by reliability, then quality, responsiveness, and cost consequently.

Cost

Table (4.3): Mean, Standard Deviation, t-value, Ranking and Implementation Level of Cost

No	Item	Mean	S.D.	t	Sig	Rank	Imp.
1	The company maximizes production output	3.43	1.286	3.388	.001	1	Medium
2	The company reduces distribution.	3.26	1.266	2.112	.037	3	Medium
3	The company uses less employees.	3.02	1.202	.165	.869	4	Medium
4	The company reduces infrastructure assets.	3.36	1.209	3.031	.003	2	Medium
5	The company reduces software licensing.	3.26	1.242	2.152	.034	3	Medium
	Cost	**3.269**	**.951**	**2.852**	**.005**		**Medium**

T-tabulated=1.980

Table (4.3) shows that the means of the cost items between 3.02 to 3.43 with a standard deviation range from 1.202 and 1.286, indicating that the respondents semi agree on medium implementation of cost items. While the average mean is 3.269 with a standard deviation of 0.951, indicating that cost is medium implemented, where t-value=2.852 is more than T-tabulated=1.980.

Quality

Table (4.4): Mean, Standard Deviation, t-value, Ranking and Implementation Level of Quality

No.	Item	Mean	S.D.	t	Sig	Rank	Imp.
1	The company uses standard procedures	3.75	1.103	6.912	.000	2	High
2	The company improves data quality system.	3.79	1.102	7.277	.000	1	High
3	The company enhances quality control on activities.	3.75	1.158	6.500	.000	2	High
4	The company shares quality specification with partners.	3.47	1.224	3.882	.000	4	Medium
5	The company updates devices continuously.	3.74	1.143	6.499	.000	3	High
	Quality	3.700	.956	7.399	.000		High

T-tabulated=1.980

Table (4.4) shows that the means of the quality items between 3.47 to 3.79 with a standard deviation range from 1.102 and 1.224, indicating that the respondents semi

agree on medium to high implementation of quality items. While the average mean is 3.70 with a standard deviation of 0.956, indicating that quality is highly implemented, where t-value=7.399 is more than T-tabulated=1.980.

Responsiveness

Table (4.5): Mean, Standard Deviation, t-value, Ranking and Implementation Level of Responsiveness

No.	Item	Mean	S.D.	t	Sig	Rank	Imp.
1	The company minimizes shipping time.	3.32	1.212	2.696	.008	5	Medium
2	The company shortens process time.	3.66	1.104	6.012	.000	3	Medium
3	The company shortens manufacturing cycle time.	3.44	1.223	3.642	.000	4	Medium
4	The company respond to markets changes as fast as possible.	3.81	1.060	7.754	.000	1	High
5	The company delivers customer orders on time.	3.75	1.140	6.598	.000	2	High
	Responsiveness	**3.5961**	**.87923**	**6.847**	**.000**		**Medium**

T-tabulated=1.980

Table (4.5) shows that the means of the Responsiveness items between 3.32 to 3.81 with a standard deviation range from 1.060 and 1.223, indicating that the respondents semi agree on medium to high implementation of Responsiveness items. While the average mean is 3.596 with a standard deviation of 0.879, indicating that Responsiveness is highly implemented, where t-value=6.847 is more than T-tabulated=1.980.

Reliability

Table (4.6): Mean, Standard Deviation, t-value, Ranking and Implementation Level of Reliability

No.	Item	Mean	S.D.	t	Sig	Rank	Imp.
1	The company coordinates delivery changes with its customers.	3.62	1.135	5.496	.000	5	Medium
2	The company responds to sudden orders.	3.68	1.026	6.659	.000	3	High
3	The company develops flexible processes.	3.82	.999	8.325	.000	1	High
4	The company responds to various orders.	3.74	1.089	6.817	.000	2	High
5	The company adapts big data analysis.	3.67	1.221	5.513	.000	4	High
	Reliability	**3.7034**	**.830**	**8.570**	**.000**		**High**

T-tabulated=1.960

Table (4.6) shows that the means of the Reliability items between 3.62 to 3.82 with a standard deviation range from 0.999 and 1.221, indicating that the respondents semi agree on medium to high implementation of Reliability items. While the average mean is 3.704 with a standard deviation of 0.830, indicating that Reliability is highly implemented, where t-value=8.570 is more than T-tabulated=1.980.

Innovation

Table (4.7): Mean, Standard Deviation, t-value, Ranking and Implementation Level of Innovation

No.	Item	Mean	S.D.	t	Sig	Rank	Imp.
1	The company encourages creative ideas.	3.81	1.106	7.433	.000	2	High
2	The company develops creative solutions for problems.	3.81	1.031	7.967	.000	2	High
3	The company uses customers' complaints to improve its activities.	3.81	1.022	8.043	.000	2	High
4	The company implement new ideas continuously.	3.78	1.087	7.290	.000	3	High
5	The company adopts new technologies within its processes.	3.88	.998	8.930	.000	1	High
	Innovation	**3.821**	**.875**	**9.486**	**.000**		High

T-tabulated=1.960

Table (4.7) shows that the means of the Innovation items between 3.78 to 3.88 with a standard deviation range from 0.998 and 1.106, indicating that the respondents semi agree on high implementation of Innovation items. While the average mean is 3.821 with a standard deviation of 0.875, indicating that Innovation is highly implemented, where t-value=8.570 is more than T-tabulated=1.980.

4.3. Relationship between Independent and Dependent Variables:

The study uses Bivariate Pearson's correlation test to check the relationship between the variables and sub-variables, and to answer the third question: What is the level of relationship between could computing and competitive advantage of Jordanian commercial organizations?

Table (4.8): Bivariate Pearson Correlation between Independent and Dependent Variables

No.			1	2	3	4	5	6	7
1	Cost	Correlation							
		Sig.							
2	Quality	Correlation	.555**						
		Sig.	.000						
3	Responsiveness	Correlation	.687**	.624**					
		Sig.	.000	.000					
4	Reliability	Correlation	.523**	.662**	.713**				
		Sig.	.000	.000	.000				
5	Innovation	Correlation	.485**	.725**	.630**	.750**			
		Sig.	.000	.000	.000	.000			
6	Competitive Advantage	Correlation	.780**	.852**	.867**	.859**	.849**		
		Sig.	.000	.000	.000	.000	.000		
7	Cloud Computing	Correlation	.650**	.663**	.641**	.537**	.569**	.731**	
		Sig.	.000	.000	.000	.000	.000	.000	

****. Correlation is significant at the 0.01 level (2-tailed).*. Correlation is significant at the 0.05 level (2-tailed).**

Table (4.8) shows that the relationships between competitive advantage dimensions are medium to strong, with r ranging from .485 to .750. Moreover, the relationship between the independent and dependent variables is very strong, where r equals 0.731.

4.4. Hypothesis Testing:

After confirming validity, reliability and the correlation between independent and dependent variables, the following tests should be carried out to ensure the validity of regression analysis. (Sekaran, 2003):

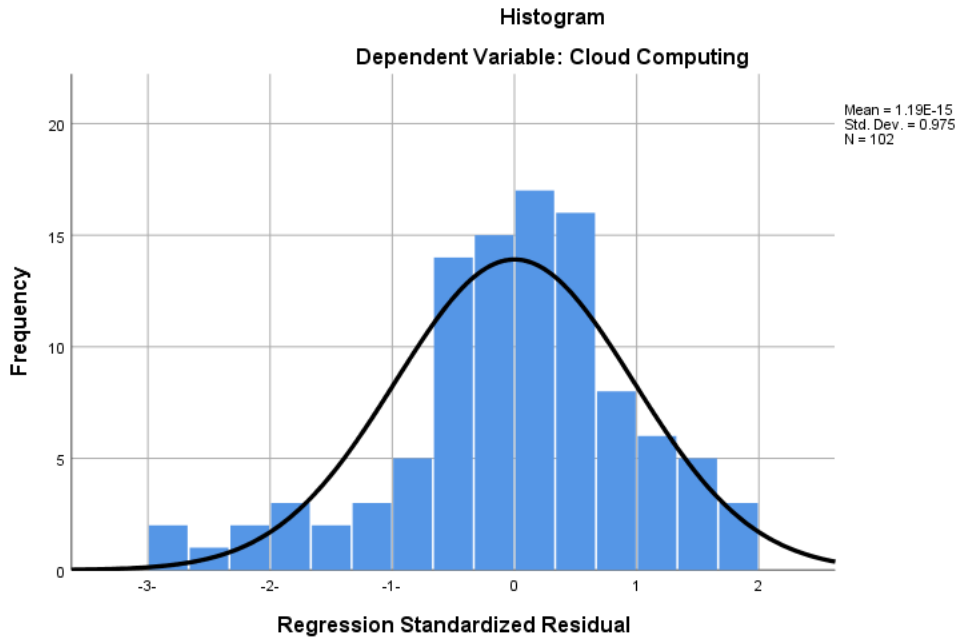

Figure (4.1): Normality Test

Normality: Figure (4.1) shows that the shape follows the normal distribution, which indicates that normality assumption is confirmed.

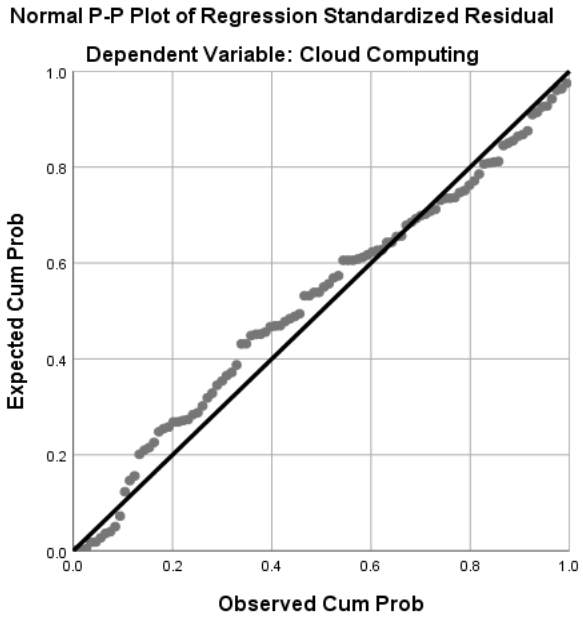

Figure (4.2): Linearity Test

Linearity test: figure (4.2) shows that the relationship between independent and dependent variables is linear relationship, so the linear relationship assumption is confirmed.

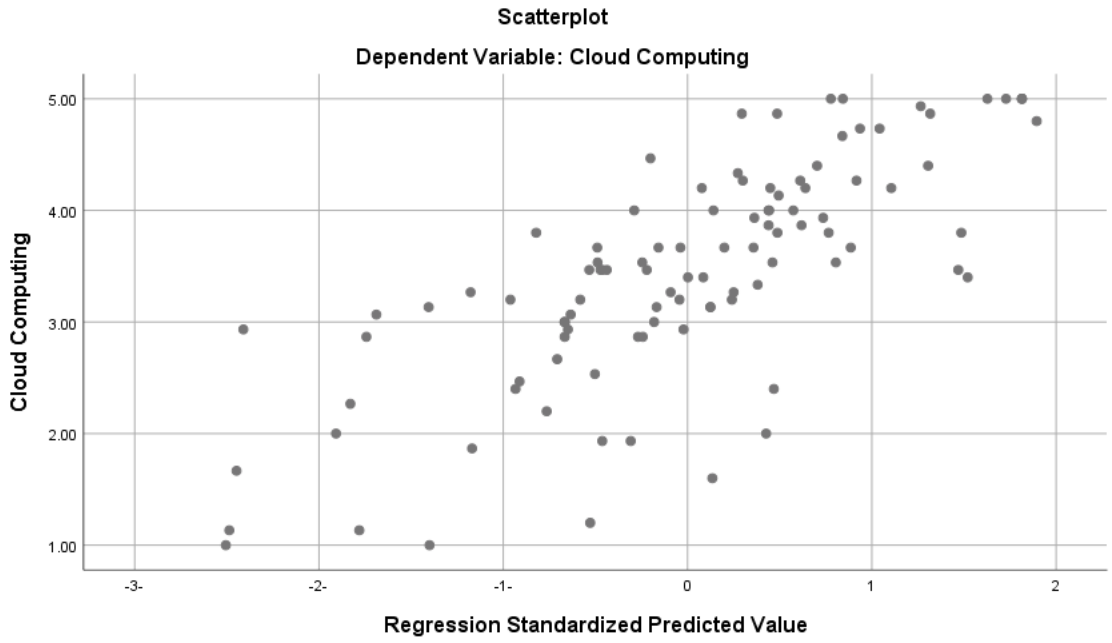

Figure (4.3): Scattered Test

Equal variance (homoscedasticity): figure (4.3) shows that the errors are scattered around the mean, therefore there is no relation between errors and predicted values, so equal variance assumption is not violated.

Table (4.9): Multi-Collinearity Test

Model		Collinearity Statistics		Durbin-Watson
		Tolerance	VIF	
1	Cost	.501	1.995	2.237
	Quality	.402	2.486	
	Responsiveness	.346	2.894	
	Reliability	.336	2.977	
	Innovation	.342	2.925	

Table (4.9) Multi-Collinearity shows that VIF (Variance Inflation Factor) value is less than 10, and tolerance is more than 10%, in so Multi-Collinearity assumption is not violated.

Main Hypothesis

H_{01}: The cloud computing does not affect the competitive advantages dimensions (cost, quality, responsiveness, reliability and innovation) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Table (4.10) shows that when regressing the cloud computing variable against the five competitive advantage dimensions, the model shows that the cloud can explain 57.5% of the variance of competitive advantages, where ($R^2 = 0.575$, F = 25.963, sig. = 0.000). Therefore, the null hypothesis is rejected and the alternative hypothesis was accepted, which states that the cloud computing affects the competitive advantages dimensions (cost, quality, responsiveness, reliability and innovation) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Table (4.10): Multiple Regressions of cloud computing Sub-variables on Competitive Advantages.

Model	R	R^2	Adjusted R^2	Std. Error	F	Sig.
1	.758[a]	.575	.553	.66627	25.963	.000[b]

a. Dependent Variable: Cloud Computing, b. Predictors: (Constant), Innovation, Cost, Quality, Responsiveness, Reliability

Based on the dimensions of competitive advantage, table (4.11) shows the impact of cloud computing on each Competitive Advantage dimension.

Table (4.11): Multiple Regressions of cloud computing on Competitive Advantages dimensions (Cost, Quality, Responsiveness, Reliability and Innovation).

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.136	.330		.411	.682
	Cost	.326	.098	.311	3.313	.001
	Quality	.354	.109	.339	3.233	.002
	Responsiveness	.230	.128	.203	1.792	.076
	Reliability	-.077-	.138	-.064-	-.557-	.579
	Innovation	.104	.130	.092	.805	.423

a. Predictors: (Constant), Cost, Quality, Responsiveness, Reliability and Innovation, b. Dependent Variable: Cloud Computing, T-tabulated=1.980

$H_{0.1}$: The cloud computing does not affect the competitive advantages dimension (cost) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Table (4.10) shows that the cloud computing affect cost, where (β=0.311, t=3.313, sig.=0.001). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, which states that the cloud computing affects the competitive advantages dimension (cost) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

$H_{0.2}$: The cloud computing does not affect the competitive advantages dimension (quality) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Table (4.10) shows that the cloud computing affects quality, where (β=0.339, t=3.233, sig.=0.002). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, which states that the cloud computing affects the competitive advantages dimension (quality) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

$H_{0.3}$: The cloud computing does not affect the competitive advantages dimension (responsiveness) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Table (4.10) shows that the cloud computing affects responsiveness, where (β=0.203, t=1.792, sig.=0.076). Therefore, the null hypothesis is accepted, which states that the cloud computing does not affect the competitive advantages dimension (responsiveness) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

$H0_{0.4}$: The cloud computing does not affect the competitive advantages dimension (reliability) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Table (4.10) shows that the cloud computing affects reliability, where (β=0.064, t=0.557, sig.=0.579). Therefore, the null hypothesis is accepted, which states that the

cloud computing does not affect the competitive advantages dimension (reliability) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

$H_{0.5}$: The cloud computing does not affect the competitive advantages dimension (innovation) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Table (4.10) shows that the cloud computing affects innovation, where (β=0.092, t=0.805, sig.=0.423). Therefore, the null hypothesis is accepted, which states that the cloud computing does not affect the competitive advantages dimension (innovation) of Jordanian Commercial Organizations, at $\alpha \leq 0.05$.

Chapter FIVE
Results Discussion, Conclusions, Recommendations

5.1. Results Discussion

The results of the study show that the Jordanian commercial organizations medium implementing cloud computing, Moreover, according to t-value the results show that the Jordanian commercial organizations weekly implement items: the company uses cloud computing for selecting shipping route, the company uses cloud computing for schedules shipments, and the company uses cloud computing for monitoring environmental.

Moreover, results show that Jordanian commercial organizations medium implementing competitive advantage, where the innovation rated the highest implementation, followed by reliability, then quality, responsiveness, and cost consequently.

The Bivariate Pearson's correlation test results show that the relationships between competitive advantage dimensions are medium to strong. Moreover, the relationship between the independent and dependent variables is very strong, where r equals 0.731.

The study result show that the cloud computing affects the competitive advantages dimensions of Jordanian Commercial Organizations, at $\alpha \leq 0.05$, where cloud computing has highest significant effect on quality then cost, however, cloud computing was not having significant effect on responsiveness, reliability and innovation.

5.2. Conclusions

The results of the study show that the Jordanian commercial organizations medium implementing cloud computing, Moreover, according to t-value the results

show that the Jordanian commercial organizations weekly implement items: the company uses cloud computing for selecting shipping route, the company uses cloud computing for schedules shipments, and the company uses cloud computing for monitoring environmental.

Moreover, results show that Jordanian commercial organizations medium implementing competitive advantage, where the innovation rated the highest implementation, followed by reliability, then quality, responsiveness, and cost consequently.

The Bivariate Pearson's correlation test results show that the relationships between competitive advantage dimensions are medium to strong. Moreover, the relationship between the independent and dependent variables is very strong, where r equals 0.731.

The study result show that the cloud computing affects the competitive advantages dimensions of Jordanian Commercial Organizations, at $\alpha \leq 0.05$, where cloud computing has highest significant effect on quality then cost, however, cloud computing was not having significant effect on responsiveness, reliability and innovation.

5.3. Recommendations

Recommendations for Jordanian Commercial Organizations:

- The study recommends that all Jordanian commercial organization to adopt information technology applications.
- The study recommends that Jordanian commercial organization to connect all branches systematically together.
- The study recommends Jordanian commercial organizations to train staff about Cloud Computing and how getting values out.

Recommendation for Future Research:

- Since this study is carried out on managers who are experts with cloud computing, the study recommends including other level of employees.
- Carrying out the study on each industry alone in Jordan.
- Carrying out the study on Arab countries e.g. Palestine, Iraq, Syria and Lebanon.
- Repeating this study in future to check the development of using cloud computing and its effect on competitive advantage.

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Appendices

Appendix (1): Panel of Referees Committee:

No.	Name	Qualification	Organization
1	Shafiq Al-Haddad	Professor of Management	Middle East University
2	Hebah Nasereddin	Professor of Computer Information System	Middle East University
3	Abdel-Aziz Sharabati	Associate Professor of Management	Middle East University
4	Abdullah Bataineh	Associate Professor of Marketing	Middle East University
5	Ayman Al khazaleh	Assistant Professor of Banking and Finance	Middle East University
6	Ahmad Tabieh	Assistant Professor of Curriculum and Instruction	Middle East University
7	Karam Tahboub	Consumer Sales Director	Zain Jordan
8	Abdallah Nashkho	Sales Planning and Intelligence Manager	Zain Jordan
9	Hussein Al Saei	Head of Technology and Infrastructure	Zain Jordan
10	Moath Al Mogbel	Engineering Infrastructure manager	Zain Jordan
11	Mohammad Al Kasem	RAN Optimization Manager	Zain Jordan

Appendix (2): Questionnaire

جـــامـعـــة الـــشـرق الأوسـط
MIDDLE EAST UNIVERSITY
Amman - Jordan

Thesis Questionnaire

Dear Mr/s. ……

Greeting,

I would like to request you to answer the attached questionnaire related to my thesis titled: "**The Impact of Cloud Computing Involvement on Competitive Advantage"**.

This questionnaire includes 40 paragraphs which, cover both independent and dependent variables, and may take only 15 minutes. The responses will be used for research purposes and will confidential and you do not need to write your name.

I requested you to indicate what is actually implemented in your company not what you wish to be implemented.

Finally, I appreciate and thank you for your participation and support, and if do you have any question or comment, please call me (0795137615).

Thank you for your effort.

Prepared by: Suliman Asha

Supervised by: Dr. Hesham AbuSaimeh

Part one: Demographic information

Company (optional):

Gender: □Male □Female

Age (years): □Less than 30 □ Bet. 30-39 □Bet. 40-50 □Above 50

Experience (years): □Less 10 □Bet.10-20 □Bet.21-30 □More than 30

Education: □Diploma □ Bachelor □Mater □Ph.D.

Position: □ Supervisor □Manager □G.M/Owner

Part two: The following 40 questions tests the perception of Jordanian Manufacturing Companies employees about the implementation of Cloud Computing on other Commercial Sector Growing. Please, rate each question according to actual implementation and not based on your belief, as follows: 1 = Never Implemented, 2 = Slightly Implemented, 3 = Sometimes, 4 = Almost Implemented, 5 = Frequently Implemented.

No.	Item	Never Implemented	Slightly Implemented	Sometimes	Almost Implemented	Frequently Implemented
	Cloud Computing					
1.	The company uses cloud computing to exchange information with partners.	1	2	3	4	5
2.	The company uses cloud computing to facilitate work	1	2	3	4	5
3.	The company synergizes its processes though cloud computing.	1	2	3	4	5
4.	The company uses cloud computing to control operations.	1	2	3	4	5
5.	The company uses cloud computing for continues process improvement.	1	2	3	4	5
6.	The company uses cloud computing to maximize production capacities.	1	2	3	4	5
7.	The company uses cloud computing for distribution network.	1	2	3	4	5
8.	The company uses cloud computing for selecting shipping route.	1	2	3	4	5
9.	The company uses cloud computing for schedules shipments.	1	2	3	4	5
10.	The company uses cloud computing for to reduce risks	1	2	3	4	5
11.	The company uses cloud computing for standardizing procedures	1	2	3	4	5
12.	The company uses cloud computing for monitoring environmental	1	2	3	4	5
13.	The company uses cloud computing for storing data	1	2	3	4	5
14.	The company uses cloud computing for reaching data at any time	1	2	3	4	5
15.	The company uses cloud computing tracks inventory activities	1	2	3	4	5
	Competitive Advantages					
	Cost					
16.	The company maximizes production output	1	2	3	4	5
17.	The company reduces distribution.	1	2	3	4	5
18.	The company uses less employees.	1	2	3	4	5

19.	The company reduces infrastructure assets.	1	2	3	4	5
20.	The company reduces software licensing.	1	2	3	4	5
	Quality					
21.	The company uses standard procedures	1	2	3	4	5
22.	The company improves data quality system.	1	2	3	4	5
23.	The company enhances quality control on activities.	1	2	3	4	5
24.	The company shares quality specification with partners.	1	2	3	4	5
25.	The company updates devices continuously.	1	2	3	4	5
	Responsiveness					
26.	The company minimizes shipping time.	1	2	3	4	5
27.	The company shortens process time.	1	2	3	4	5
28.	The company shortens manufacturing cycle time.	1	2	3	4	5
29.	The company respond to markets changes as fast as possible.	1	2	3	4	5
30.	The company delivers customer orders on time.	1	2	3	4	5
	Reliability					
31.	The company coordinates delivery changes with its customers.	1	2	3	4	5
32.	The company responds to sudden orders.	1	2	3	4	5
33.	The company develops flexible processes.	1	2	3	4	5
34.	The company responds to various orders.	1	2	3	4	5
35.	The company adapts big data analysis.	1	2	3	4	5
	Innovation					
36.	The company encourages creative ideas.	1	2	3	4	5
37.	The company develops creative solutions for problems.	1	2	3	4	5
38.	The company uses customers' complaints to improve its activities.	1	2	3	4	5
39.	The company implement new ideas continuously.	1	2	3	4	5
40.	The company adopts new technologies within its processes.	1	2	3	4	5

Appendix (3): Data Analysis:

```
FACTOR
  /VARIABLES CC1 CC2 CC3 CC4 CC5 CC6 CC7 CC8 CC9 CC10 CC11 CC12 CC13
CC14 CC15
```

Factor Analysis

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.917
Bartlett's Test of Sphericity	Approx. Chi-Square	1259.896
	df	105
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.068	60.451	60.451	9.068	60.451	60.451
2	1.204	8.024	68.475	1.204	8.024	68.475
3	.828	5.522	73.997			
4	.705	4.697	78.694			
5	.561	3.738	82.432			
6	.520	3.464	85.896			
7	.411	2.739	88.636			
8	.356	2.376	91.011			
9	.278	1.856	92.867			
10	.248	1.655	94.522			
11	.229	1.526	96.049			
12	.199	1.324	97.373			
13	.173	1.153	98.527			
14	.123	.822	99.349			
15	.098	.651	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component	
	1	2
The company uses cloud computing to exchange information with partners.	.808	-.268-
The company uses cloud computing to facilitate work	.773	-.357-
The company synergizes its processes though cloud computing.	.773	-.294-
The company uses cloud computing to control operations.	.870	-.036-
The company uses cloud computing for continues process improvement.	.825	.119

The company uses cloud computing to maximize production capacities.	.797	.251
The company uses cloud computing for distribution network.	.789	.111
The company uses cloud computing for selecting shipping route.	.706	.518
The company uses cloud computing for schedules shipments.	.763	.466
The company uses cloud computing for to reduce risks	.723	-.130-
The company uses cloud computing for standardizing procedures	.776	-.106-
The company uses cloud computing for monitoring environmental	.710	.356
The company uses cloud computing for storing data	.781	-.320-
The company uses cloud computing for reaching data at any time	.817	-.282-
The company uses cloud computing tracks inventory activities	.732	.064
Extraction Method: Principal Component Analysis.		
a. 2 components extracted.		

Factor Analysis

```
  /VARIABLES Cost1 Cost2 Cost3 Cost4 Cost5
```

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.715
Bartlett's Test of Sphericity	Approx. Chi-Square	203.402
	df	10
	Sig.	.000

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.952	59.042	59.042	2.952	59.042	59.042
2	.902	18.042	77.085			
3	.505	10.099	87.183			
4	.412	8.237	95.420			
5	.229	4.580	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]	
	Component
	1
The company maximizes production output	.687
The company reduces distribution.	.808
The company uses less employees.	.818
The company reduces infrastructure assets.	.784
The company reduces software licensing.	.739
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Factor Analysis

```
/VARIABLES Qual1 Qual2 Qual3 Qual4 Qual5
```

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.856
Bartlett's Test of Sphericity	Approx. Chi-Square	293.546
	df	10
	Sig.	.000

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.489	69.780	69.780	3.489	69.780	69.780
2	.552	11.042	80.822			
3	.428	8.558	89.380			
4	.360	7.195	96.575			
5	.171	3.425	100.000			
Extraction Method: Principal Component Analysis.						

Component Matrix[a]	
	Component
	1
The company uses standard procedures	.764
The company improves data quality system.	.871
The company enhances quality control on activities.	.924
The company shares quality specification with partners.	.822
The company updates devices continuously.	.785
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Factor Analysis

```
/VARIABLES Resp1 Resp2 Resp3 Resp4 Rep5
```

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.803
Bartlett's Test of Sphericity	Approx. Chi-Square	172.420
	df	10
	Sig.	.000

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.945	58.909	58.909	2.945	58.909	58.909
2	.717	14.342	73.252			
3	.585	11.694	84.946			
4	.408	8.160	93.106			
5	.345	6.894	100.000			
Extraction Method: Principal Component Analysis.						

Component Matrix[a]	
	Component
	1
The company minimizes shipping time.	.734
The company shortens process time.	.830
The company shortens manufacturing cycle time.	.795
The company respond to markets changes as fast as possible.	.778
The company delivers customer orders on time.	.693
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Factor Analysis

```
/VARIABLES Reli1 Reli2 Reli3 Reli4 Reli5
```

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.766
Bartlett's Test of Sphericity	Approx. Chi-Square	180.853
	df	10
	Sig.	.000

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.902	58.040	58.040	2.902	58.040	58.040
2	.796	15.913	73.953			
3	.605	12.097	86.050			
4	.435	8.702	94.752			
5	.262	5.248	100.000			
Extraction Method: Principal Component Analysis.						

Component Matrix[a]	
	Component
	1
The company coordinates delivery changes with its customers.	.789
The company responds to sudden orders.	.839
The company develops flexible processes.	.783
The company responds to various orders.	.703
The company adapts big data analysis.	.685
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Factor Analysis

```
/VARIABLES Innov1 Innvo2 Innvo3 Innvo4 Innov5
```

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.867
Bartlett's Test of Sphericity	Approx. Chi-Square	281.294
	df	10
	Sig.	.000

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.484	69.677	69.677	3.484	69.677	69.677
2	.564	11.286	80.963			
3	.398	7.951	88.914			
4	.334	6.679	95.593			
5	.220	4.407	100.000			
Extraction Method: Principal Component Analysis.						

Component Matrix[a]	
	Component
	1
The company encourages creative ideas.	.828
The company develops creative solutions for problems.	.873
The company uses customers' complaints to improve its activities.	.744
The company implement new ideas continuously.	.892
The company adopts new technologies within its processes.	.830
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Factor Analysis

```
/VARIABLES Cost Qual Resp Reli Innov
```

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.834
Bartlett's Test of Sphericity	Approx. Chi-Square	308.970
	df	10
	Sig.	.000

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.549	70.977	70.977	3.549	70.977	70.977
2	.614	12.272	83.250			
3	.375	7.500	90.750			
4	.249	4.974	95.724			
5	.214	4.276	100.000			
Extraction Method: Principal Component Analysis.						

Component Matrix[a]	
	Component
	1
Cost	.761
Quality	.849
Responseveness	.869
Reliability	.872
Innovation	.857
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

```
RELIABILITY

  /VARIABLES=CC1 CC2 CC3 CC4 CC5 CC6 CC7 CC8 CC9 CC10 CC11 CC12 CC13
CC14 CC15
```

Scale: ALL VARIABLES

Reliability Statistics	
Cronbach's Alpha	N of Items
.952	15

```
RELIABILITY
  /VARIABLES=Cost1 Cost2 Cost3 Cost4 Cost5
```

Reliability Statistics	
Cronbach's Alpha	N of Items
.824	5

```
RELIABILITY
  /VARIABLES=Qual1 Qual2 Qual3 Qual4 Qual5
```

Reliability Statistics	
Cronbach's Alpha	N of Items
.890	5

```
RELIABILITY
  /VARIABLES=Resp1 Resp2 Resp3 Resp4 Rep5
```

Reliability Statistics	
Cronbach's Alpha	N of Items
.823	5

```
RELIABILITY
  /VARIABLES=Reli1 Reli2 Reli3 Reli4 Reli5
```

Reliability Statistics	
Cronbach's Alpha	N of Items
.813	5

```
RELIABILITY
  /VARIABLES=Innov1 Innvo2 Innvo3 Innvo4 Innov5
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA.
```

Reliability Statistics	
Cronbach's Alpha	N of Items
.890	5

```
RELIABILITY
  /VARIABLES=Cost Qual Resp Reli Innov
```

Reliability Statistics	
Cronbach's Alpha	N of Items
.895	5

Demographic:

```
FREQUENCIES VARIABLES=Gender Agge Experience Education Position
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

		Gender	Age Years	Experience Years	Education	Position
N	Valid	102	102	102	102	102
	Missing	0	0	0	0	0

Frequency Table

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	78	76.5	76.5	76.5
	Female	24	23.5	23.5	100.0
	Total	102	100.0	100.0	

Age Years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 30	19	18.6	18.6	18.6
	Bet. 30-39	50	49.0	49.0	67.6
	Bet. 40-49	32	31.4	31.4	99.0
	More than 50	1	1.0	1.0	100.0
	Total	102	100.0	100.0	

Experience Years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less Than 10	27	26.5	26.5	26.5
	Bet. 10-20	56	54.9	54.9	81.4
	Bet. 21-30	17	16.7	16.7	98.0
	More Than 30	2	2.0	2.0	100.0
	Total	102	100.0	100.0	

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	8	7.8	7.8	7.8
	Bachelor	70	68.6	68.6	76.5

	Master	18	17.6	17.6	94.1
	Ph.D	6	5.9	5.9	100.0
	Total	102	100.0	100.0	

Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Supervisor	46	45.1	45.1	45.1
	Manager	47	46.1	46.1	91.2
	G.M/Owner	9	8.8	8.8	100.0
	Total	102	100.0	100.0	

Descriptive:

```
  /VARIABLES=CC1 CC2 CC3 CC4 CC5 CC6 CC7 CC8 CC9 CC10 CC11 CC12 CC13
CC14 CC15 CC
  /CRITERIA=CI(.95).
```

T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The company uses cloud computing to exchange information with partners.	102	3.39	1.204	.119
The company uses cloud computing to facilitate work	102	3.52	1.167	.116
The company synergizes its processes though cloud computing.	102	3.38	1.259	.125
The company uses cloud computing to control operations.	102	3.52	1.241	.123
The company uses cloud computing for continues process improvement.	102	3.43	1.301	.129
The company uses cloud computing to maximize production capacities.	102	3.47	1.426	.141
The company uses cloud computing for distribution network.	102	3.51	1.333	.132

The company uses cloud computing for selecting shipping route.	102	3.06	1.356	.134
The company uses cloud computing for schedules shipments.	102	3.13	1.376	.136
The company uses cloud computing for to reduce risks	102	3.56	1.239	.123
The company uses cloud computing for standardizing procedures	102	3.56	1.207	.120
The company uses cloud computing for monitoring environmental	102	3.25	1.338	.133
The company uses cloud computing for storing data	102	3.81	1.311	.130
The company uses cloud computing for reaching data at any time	102	3.83	1.251	.124
The company uses cloud computing tracks inventory activities	102	3.34	1.247	.123
Cloud Computing	102	3.4510	.99624	.09864

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The company uses cloud computing to exchange information with partners.	3.291	101	.001	.392	.16	.63
The company uses cloud computing to facilitate work	4.498	101	.000	.520	.29	.75
The company synergizes its processes though cloud computing.	3.067	101	.003	.382	.14	.63
The company uses cloud computing to control operations.	4.230	101	.000	.520	.28	.76

The company uses cloud computing for continues process improvement.	3.348	101	.001	.431	.18	.69
The company uses cloud computing to maximize production capacities.	3.333	101	.001	.471	.19	.75
The company uses cloud computing for distribution network.	3.862	101	.000	.510	.25	.77
The company uses cloud computing for selecting shipping route.	.438	101	.662	.059	-.21-	.33
The company uses cloud computing for schedules shipments.	.935	101	.352	.127	-.14-	.40
The company uses cloud computing for to reduce risks	4.554	101	.000	.559	.32	.80
The company uses cloud computing for standardizing procedures	4.676	101	.000	.559	.32	.80
The company uses cloud computing for monitoring environmental	1.850	101	.067	.245	-.02-	.51
The company uses cloud computing for storing data	6.271	101	.000	.814	.56	1.07
The company uses cloud computing for reaching data at any time	6.725	101	.000	.833	.59	1.08
The company uses cloud computing tracks inventory activities	2.780	101	.006	.343	.10	.59
Cloud Computing	4.572	101	.000	.45098	.2553	.6467

```
T-TEST
  /VARIABLES=Cost1 Cost2 Cost3 Cost4 Cost5 Cost
```

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The company maximizes production output	102	3.43	1.286	.127
The company reduces distribution.	102	3.26	1.266	.125
The company uses less employees.	102	3.02	1.202	.119
The company reduces infrastructure assets.	102	3.36	1.209	.120
The company reduces software licensing.	102	3.26	1.242	.123
Cost	102	3.2686	.95129	.09419

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The company maximizes production output	3.388	101	.001	.431	.18	.68
The company reduces distribution.	2.112	101	.037	.265	.02	.51
The company uses less employees.	.165	101	.869	.020	-.22-	.26
The company reduces infrastructure assets.	3.031	101	.003	.363	.13	.60
The company reduces software licensing.	2.152	101	.034	.265	.02	.51
Cost	2.852	101	.005	.26863	.0818	.4555

```
T-TEST

  /TESTVAL=3
  /MISSING=ANALYSIS
  /VARIABLES=Qual1 Qual2 Qual3 Qual4 Qual5 Qual
```

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The company uses standard procedures	102	3.75	1.103	.109
The company improves data quality system.	102	3.79	1.102	.109
The company enhances quality control on activities.	102	3.75	1.158	.115
The company shares quality specification with partners.	102	3.47	1.224	.121
The company updates devices continuously.	102	3.74	1.143	.113
Quality	102	3.7000	.95555	.09461

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The company uses standard procedures	6.912	101	.000	.755	.54	.97
The company improves data quality system.	7.277	101	.000	.794	.58	1.01
The company enhances quality control on activities.	6.500	101	.000	.745	.52	.97
The company shares quality specification with partners.	3.882	101	.000	.471	.23	.71
The company updates devices continuously.	6.499	101	.000	.735	.51	.96
Quality	7.399	101	.000	.70000	.5123	.8877

```
T-TEST

  /TESTVAL=3
  /MISSING=ANALYSIS
  /VARIABLES=Resp1 Resp2 Resp3 Resp4 Rep5 Resp
```

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The company minimizes shipping time.	102	3.32	1.212	.120
The company shortens process time.	102	3.66	1.104	.109
The company shortens manufacturing cycle time.	102	3.44	1.223	.121
The company respond to markets changes as fast as possible.	102	3.81	1.060	.105
The company delivers customer orders on time.	102	3.75	1.140	.113
Responseveness	102	3.5961	.87923	.08706

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The company minimizes shipping time.	2.696	101	.008	.324	.09	.56
The company shortens process time.	6.012	101	.000	.657	.44	.87
The company shortens manufacturing cycle time.	3.642	101	.000	.441	.20	.68
The company respond to markets changes as fast as possible.	7.754	101	.000	.814	.61	1.02
The company delivers customer orders on time.	6.598	101	.000	.745	.52	.97
Responseveness	6.847	101	.000	.59608	.4234	.7688

```
T-TEST

  /TESTVAL=3
  /MISSING=ANALYSIS
  /VARIABLES=Reli1 Reli2 Reli3 Reli4 Reli5 Reli
```

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The company coordinates delivery changes with its customers.	102	3.62	1.135	.112
The company responds to sudden orders.	102	3.68	1.026	.102
The company develops flexible processes.	102	3.82	.999	.099
The company responds to various orders.	102	3.74	1.089	.108
The company adapts big data analysis.	102	3.67	1.221	.121
Reliability	102	3.7039	.82952	.08213

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The company coordinates delivery changes with its customers.	5.496	101	.000	.618	.39	.84
The company responds to sudden orders.	6.659	101	.000	.676	.47	.88
The company develops flexible processes.	8.325	101	.000	.824	.63	1.02
The company responds to various orders.	6.817	101	.000	.735	.52	.95
The company adapts big data analysis.	5.513	101	.000	.667	.43	.91
Reliability	8.570	101	.000	.70392	.5410	.8669

```
T-TEST

  /TESTVAL=3
  /MISSING=ANALYSIS
  /VARIABLES=Innov1 Innvo2 Innvo3 Innvo4 Innov5 Innov
```

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
The company encourages creative ideas.	102	3.81	1.106	.109
The company develops creative solutions for problems.	102	3.81	1.031	.102
The company uses customers' complaints to improve its activities.	102	3.81	1.022	.101
The company implement new ideas continuously.	102	3.78	1.087	.108
The company adopts new technologies within its processes.	102	3.88	.998	.099
Innovation	102	3.8216	.87469	.08661

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The company encourages creative ideas.	7.433	101	.000	.814	.60	1.03
The company develops creative solutions for problems.	7.967	101	.000	.814	.61	1.02
The company uses customers' complaints to improve its activities.	8.043	101	.000	.814	.61	1.01
The company implement new ideas continuously.	7.290	101	.000	.784	.57	1.00
The company adopts new technologies within its processes.	8.930	101	.000	.882	.69	1.08
Innovation	9.486	101	.000	.82157	.6498	.9934

```
T-TEST
  /TESTVAL=3
```

```
/MISSING=ANALYSIS
/VARIABLES=Cost Qual Resp Reli Innov CA
```

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Cost	102	3.2686	.95129	.09419
Quality	102	3.7000	.95555	.09461
Responseveness	102	3.5961	.87923	.08706
Reliability	102	3.7039	.82952	.08213
Innovation	102	3.8216	.87469	.08661
Competitive Advantage	102	3.6180	.75477	.07473

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Cost	2.852	101	.005	.26863	.0818	.4555
Quality	7.399	101	.000	.70000	.5123	.8877
Responseveness	6.847	101	.000	.59608	.4234	.7688
Reliability	8.570	101	.000	.70392	.5410	.8669
Innovation	9.486	101	.000	.82157	.6498	.9934
Competitive Advantage	8.270	101	.000	.61804	.4698	.7663

Correlations

```
/VARIABLES=Cost Qual Resp Reli Innov CA CC
```

Correlations

		Cost	Quality	Responseveness	Reliability	Innovation	Competitive Advantage	Cloud Computing
Cost	Pearson Correlation	1	.555**	.687**	.523**	.485**	.780**	.650**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	102	102	102	102	102	102	102
Quality	Pearson Correlation	.555**	1	.624**	.662**	.725**	.852**	.663**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	102	102	102	102	102	102	102
Responsev eness	Pearson Correlation	.687**	.624**	1	.713**	.630**	.867**	.641**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	102	102	102	102	102	102	102
Reliability	Pearson Correlation	.523**	.662**	.713**	1	.750**	.859**	.537**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	102	102	102	102	102	102	102
Innovation	Pearson Correlation	.485**	.725**	.630**	.750**	1	.849**	.569**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	102	102	102	102	102	102	102
Competitive Advantage	Pearson Correlation	.780**	.852**	.867**	.859**	.849**	1	.731**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	102	102	102	102	102	102	102
Cloud Computing	Pearson Correlation	.650**	.663**	.641**	.537**	.569**	.731**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	102	102	102	102	102	102	102

**. Correlation is significant at the 0.01 level (2-tailed).

Regression

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	**.758[a]**	**.575**	**.553**	**.66627**	**2.237**

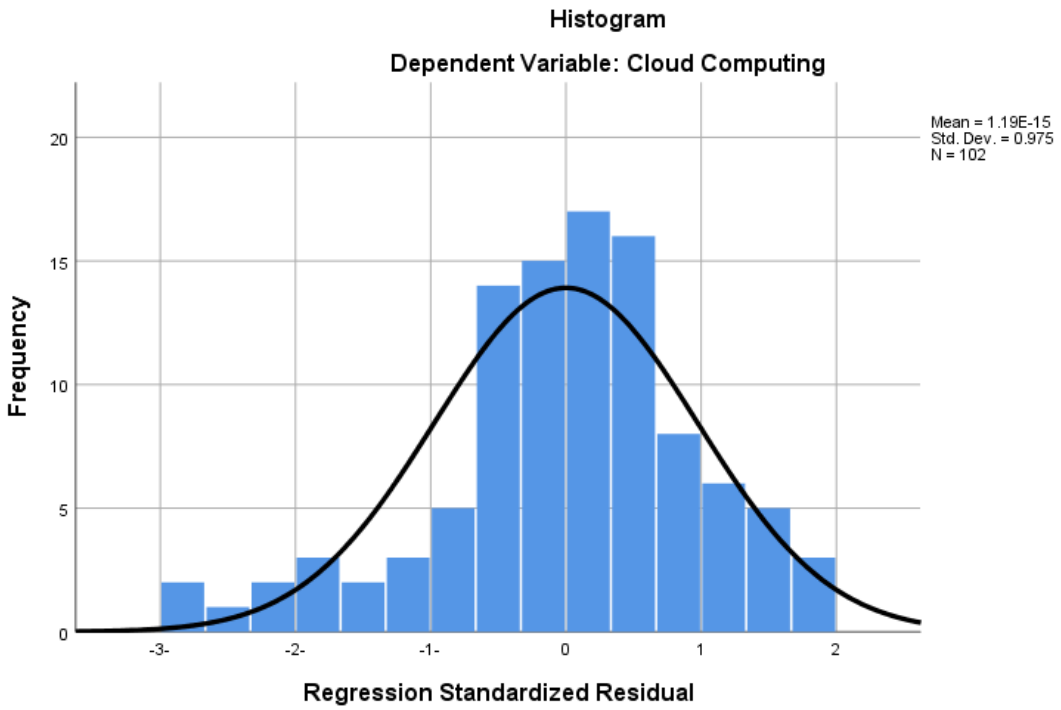
a. Predictors: (Constant), Innovation, Cost, Quality, Responseveness, Reliability

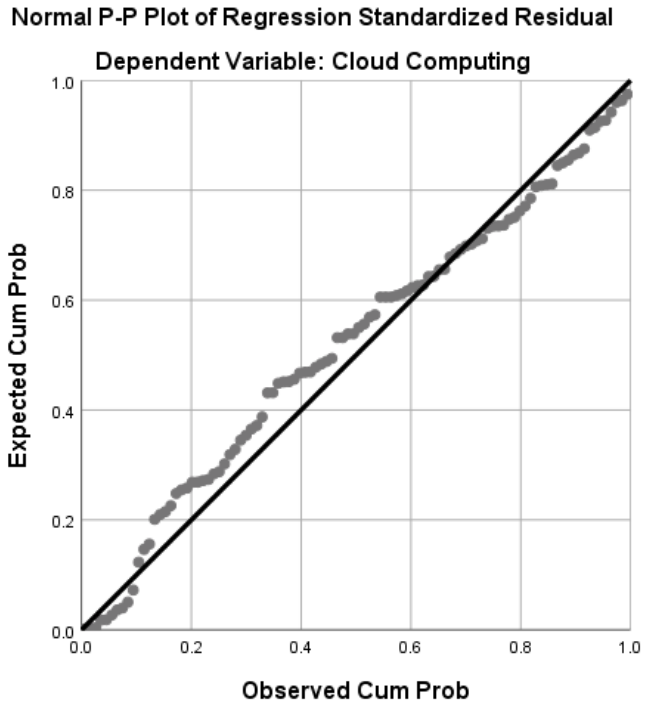
b. Dependent Variable: Cloud Computing

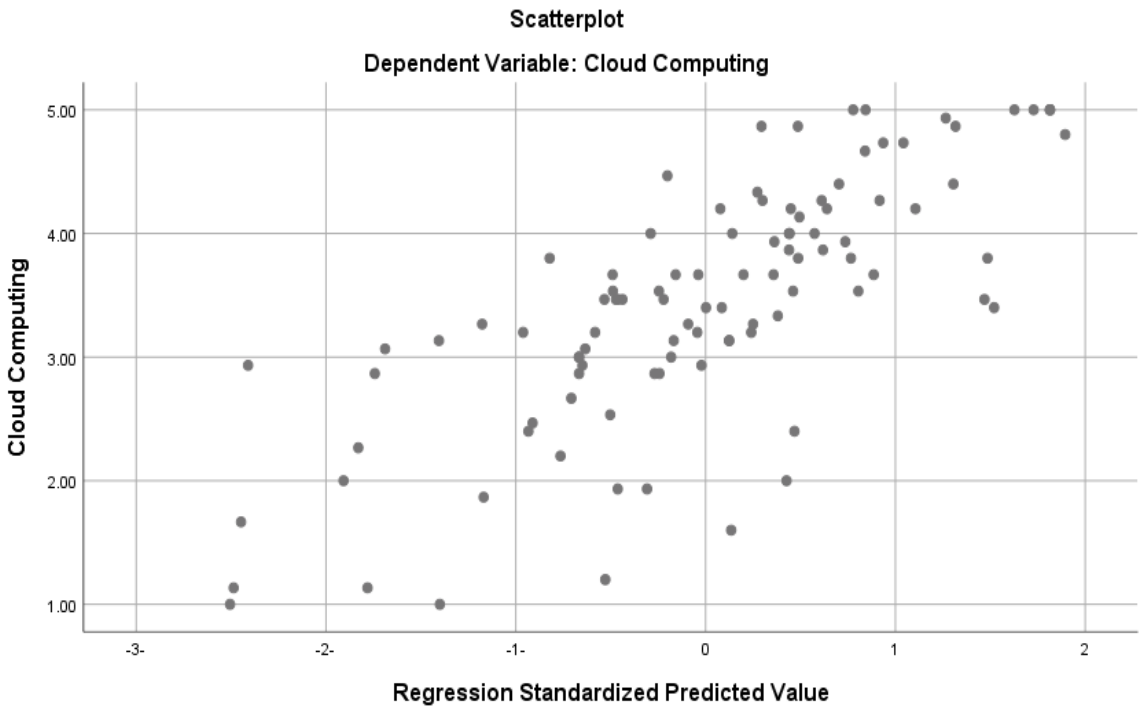
ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.626	5	11.525	**25.963**	**.000[b]**
	Residual	42.616	96	.444		
	Total	100.242	101			
a. Dependent Variable: Cloud Computing						
b. Predictors: (Constant), Innovation, Cost, Quality, Responseveness, Reliability						

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	**Tolerance**	**VIF**
1	(Constant)	.136	.330		.411	.682		
	Cost	.326	.098	.311	3.313	.001	**.501**	**1.995**
	Quality	.354	.109	.339	3.233	.002	**.402**	**2.486**
	Responseveness	.230	.128	.203	1.792	.076	**.346**	**2.894**
	Reliability	-.077-	.138	-.064-	-.557-	.579	**.336**	**2.977**
	Innovation	.104	.130	.092	.805	.423	**.342**	**2.925**
a. Dependent Variable: Cloud Computing								

Charts


Histogram
Dependent Variable: Cloud Computing
Mean = 1.19E-15
Std. Dev. = 0.975
N = 102
Frequency
20
15
10
5
0
-3-
-2-
-1-
0
1
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Cloud Computing
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob


Scatterplot
Dependent Variable: Cloud Computing
Cloud Computing
5.00
4.00
3.00
2.00
1.00
-3-
-2-
-1-
0
1
2
Regression Standardized Predicted Value