An empirical study of establishing guidelines for evaluation and adoption of secure and cost effective cloud computing

An Empirical Study of Establishing Guidelines for Evaluation and Adoption of Secure and Cost Effective Cloud Computing

A thesis submitted by

Raja Muhammad Ubaid Ullah,
School of Engineering, Computing and Mathematical Sciences
University of Wolverhampton,
Wulfruna Street, Wolverhampton WV1 1LY

For the award of

Doctor of Philosophy

Supervisors:

Buckley, Kevan A. (Dr)

Mary Garvey (Dr)

Jun Li (Dr)

Table of Contents

Appendix A - List of Abbreviations

AHP - Analytic Hierarchy Process

API – Application Programming Interface

CAPEX - Capital Expenditure

CBR - Case Based Reasoning

CC – Cloud Computing

CCT – Cloud Computing Technology

CDB - Container Database

CIST - Conference on Computer and Information Science and Technology

CRM - Customer Relationship Management

CSP - Cloud Service Provider

DBaaS - Database as a Service

DBMS - Database Management System

DDL - Data Definition Language

ES - Expert System

FTP – File Transfer Protocol

GLB - Gramm Leach-Bliley Act

HIPAA - Health Insurance Portability and Accountability Act

HTML - Hyper Text Markup Language

HTTP - Hyper Text Transfer Protocol

IaaS - Infrastructure as a Service

ICT – Information and Communication Technology

IDDI - Independent Database Dependent Instances

IDII - Independent Database Independent Instances

ISV - Independent Service Vendor

IT – Information Technology

ITSI - Independent Tables Shared Instances

LAYER - Load As You Query

MMT - Massive Multi-tenant

MTD - Multi -Tenant Database

NIST – National Institute of Standards and Technology

PaaS - Platform as a Service

PDB - Pluggable Database

RDBMS - Relational Database Management System

RII - Relative Impact Index

ROI - Return on Investment

SaaS - Software as a Service

SLA - Service Level Agreement

SLR - Systematic literature review

SME - small and medium enterprise

SPSS - Statistical Package for the Social Sciences

SQL - Structured Query Language

STSI - Shared Tables Shared Instances

TCO - Total Cost of Ownership

TCP/IP – Transport Control Protocol/Internet Protocol

UKAIS - UK Academy for Information Systems

UKOUG - UK Oracle Users Group

UofD - Universe of Discourse

VCE - Virtual Computing Environment

VM - Virtual Machine

XaaS - Everything as a Service

Appendix B - List of Figures / Screenshots

Appendix C - List of Tables

List of publications:

Journals:

1- **Guidelines for CC Architecture: Development Process**", IJCTT, Volume-67 Issue-8, Year of Publication: 23rd August 2019.
http://www.ijcttjournal.org/archives/ijctt-v67i8p107

2- "**The Challenges of CC in Forensic Science**", IJCTT, Volume-67, Year of Publication: 29th July 2019.
http://www.ijcttjournal.org/archives/ijctt-v67i7p106

3- "**CC Adoption in Enterprise: Challenges and Benefits**", IJCTT, Volume-67 Issue-6, Year of Publication: 29th June 2019.
http://www.ijcttjournal.org/archives/ijctt-v67i6p116

4- "**Factors Analysis of the Adoption of CC in England**", IJCTT, Volume-67 Issue-6, Year of Publication: 15th June 2019.
http://www.ijcttjournal.org/archives/ijctt-v67i6p103

5- "**A Survey Based Investigation for CC Adoption Internationally**", IJCTT, Volume-67 Issue-4, Year of Publication: 04th May 2019.
http://www.ijcttjournal.org/archives/ijctt-v67i4p122

6- "**A Systematic Literature Review of Factors Affecting CC Adoption Internationally**", IJCTT, Volume-67 Issue-3, Year of Publication: 25th March 2019.
http://www.ijcttjournal.org/archives/ijctt-v67i3p110

Conference:

1- "Architecture guidelines for SaaS development process ", 2017 International Conference on Cloud and Big Data Computing, 2017 the 6th International London
https://dl.acm.org/doi/abs/10.1145/3141128.3141136

ACKNOWLEDGEMENTS

I would like to say thanks to supervisors Dr. Kevan A. Buckley (Head of Computer Science), Dr. Mary Garvey (Senior Lecturer), and Dr. Jun Li (Lecturer in Software Engineering) for their advice and guidance on research throughout the studies. Also thanks to Professor Amar Aggoun (Head of School of Mathematics and Computer Science) for his support during study and special thanks to Dr. Paul J. Wilson (Senior Lecturer in Statistics), and Dr Subashini Suresh (Reader and Director for Postgraduate Research Programme),

.

I also would like to say thanks to family and friends, especially son Raja Muhammad Kazim Ubaid, daughter Innahiya Kiani, wife Mrs. Fazailat Ubaid, auntie Miss Hamida Khanum, brother Raja Muhammad Yasir, niece Nareen Sajid, nephew Raja Muhammad Shaffin, friends Farhat Abbass Kiani and Ch. Mohammed Malik for their support and prayers throughout the studies.

I dedicate this thesis to Mother late Mrs. Zohra Begum, Father late Raja Muhammad Anwar, Uncle late Raja Muhammad Arif, and Sister late Mrs. Rubina Akhtar.

Abstract

This research investigates the factors influencing large enterprises, small and medium-sized enterprises (SMEs) behavioural intention toward adopting cloud computing (CC) services. The increasing adoption of CC services is changing how businesses maintain, select, update, and manage information and communication technology. In particular, CC services have the potential to improve IT systems reliability and scalability, allowing large enterprises and SMEs to use their limited resources on their core business and strategy. Many factors and variables influence technology adoption and usage decisions in the large enterprises and SMEs context. Despite the extensive literature, there still needs to be more research on the factors influencing large enterprises and SMEs uptakes CC services adoption. Therefore, examining large enterprises and SMEs adoption of CC is essential for successfully implementing this system.

This thesis uses environmental, human, organisational, and technological factors to model the relationship between the variables considered and CC services adoption to increase the probability that large enterprises, and SMEs adopt CC services successfully. The study considers the influence of eleven variables: external support, competitive pressure, senior management support, employee's cloud knowledge, adequate resources, information intensity, relative advantage, complexity, compatibility, security/privacy, and cost-effectiveness.

A quantitative research approach was applied using an online questionnaire. A conceptual model of CC services adoption by large enterprises and SMEs has been developed. Research factors and variables identified to influence the likelihood that large enterprises and SMEs would adopt CC services successfully. In particular, we found nine research variables to be statistically significant, and two *adequate support* and *complexity* non-significant. It was found that CC services adoption variances among the size of organisations to differ and be statistically significant towards adopting CC services. Hence, this result is important to owners and decision makers of large enterprises, and SMEs enterprises, service providers, service consultants, and governments to assist them in facilitating the adoption of CC services by large enterprises, and SMEs. Further, this may help to establish strategies for large enterprises, and SMEs to confirm a better adoption of CC services.

Keywords: cloud computing, cloud, adoption, security, services, evaluation.

Chapter 1 - Study Rationale

1.1 Introduction

This chapter offers an overview of the research. It describes the research upbringing, opportunity, motivation, aim/objective, problem, and significance of the study. The chapter provides an outline of the thesis structure. In undertaking any research, it is important to establish the basis behind such a study as it turns into a reference point for future research. Therefore, chapter one provides an inclusive introduction to the thesis.

1.2 Context of the Study

The growth of new technology in the modern business market boosts competition to the highest level, resulting in obsolete products and skills (Pauly et al., 2011). Due to limited resources, some organisations have less advantage in competition than others. Limited resources lead to restricted access to new technologies of Information Technology (IT) services for some organisations (Haslinda and Mohd, 2017). “The need to respond to business demands quickly is imperative in this new age. Waiting six to eight weeks for a new server deployment is unacceptable” (Primus, 2011).

Appropriately using Information and Communication Technologies (ICT) helps organisations become more efficient (Khong, Uchenna and Siong, 2012). CC is a model for delivering information services that provide flexible use of servers, scalability, and services management (Kristina and Andreja, 2017). A new strategy should enable small and medium enterprises (SMEs) to incorporate new technologies, reduce costs, develop process innovation, and enhance the speed of implementation.

1.3 Overview and Motivation

With internet technologies, CC becomes a computing style for flexible and scalable IT functionalities delivered as a service to external customers (James, 2020). Considered CC is not a revolutionary idea; instead, it is an evolutionary concept that incorporates different existing technologies, which offer a valuable new IT provisioning tool to carry on business

activities successfully. Most businesses are considering shifting computing resources to the cloud or are in the process of doing so. CC is one of today's most important technologies.

The continued growth of the CC industry motivated me to select this domain for research. The contribution of this research is the evaluation of guidelines for the adoption of secure CC services that accelerates the business process in companies, lowers cost, the high-quality information, and helps different stakeholders of the business to make correct adoption decisions.

1.4 Problem Definition

The cloud service providers (CSPs) and cloud service users industry has shown economic potential almost in all parts and in industries size (Hasan, 2011). Intense Organisational competition and challenges provide cloud services to secure cloud platforms from the consumer perspective. More organisations and businesses are entering the cloud to use their secure cloud services to perform business activities (Cegielski et al., 2012). Changes in IT technology have increased the industry's demand and intense competition, affecting the business need requirements and impacting the CC services adoption decision in business activities.

There is a need to fill the knowledge gap that believes to exist in the field (C.Lakshmi, 2014), (Haslinda and Mohd, 2017). Several companies even need to understand what CC services are or for what purpose someone can use them. Companies' decision not to implement CC services could be due to a lack of knowledge, professional expertise, and information (Stephen, 2012). Some still believe in-house technology is better and cheaper than CC in competition with a more traditional IT solution. (Theo et al., 2018).

1.5 Aims and Objectives

This research aims to understand and contribute to CC services research by empirically assessing and describing factors that influence or inhibit evaluation, and provide guidelines for adopting secure and cost-effective CC services by businesses and organisations. Part of the rationale for dedicating this effort to studying CC research work has yet to reach the level of clarity or shared conceptions of more mature areas of computing (Manuel, Jan and Daniel, 2019). This research focuses on the following objectives:

- To develop a conceptual model to study a firm evaluation and adoption of secure and cost-effective CC services.
- To identify the factors that encourage or limit the companies' evaluation of secure and cost-effective CC services adoption. Empirically validate the proposed research conceptual model quantitatively and qualitatively, and ensure its validity by testing it using a survey questionnaire online and an interview method, respectively.
- To discuss the perceptions of companies and influential factors and provide essential recommendations for decision-makers that relate to the evaluation of secure and cost-effective CC services adoption within organisations.

This study is a combination of academic and practical rationale. This research investigation will contribute to filling the gaps in the ICT adoption literature, guidelines, and evaluation of secure and cost-effective CC services adoption literature relating to businesses and organisations. Following limitations, criticism, and uniformity of current ICT adoption research regarding the theories used, such as (Omar et al., 2020), (Eze, 2013), expressed their concern about the homogeneity of current ICT adoption studies.

This study will use a conceptual model, which considers environmental, human, organisational, and technological factors. Researchers have suggested that more empirical studies are required over time to enable a better, healthy understanding of the complex processes, differentiating factors that affect the information systems adoption process and their influence on companies (Michael et al., 2009), (Khater, 2017).

1.6 Research Questions

Research question development is a process of highlighting a potential issue. (Karen and Stephen, 2010) State that the research question emphasises a lack or absence of understanding about an issue; hence the research question determines a gap. The following research questions have been developed to achieve the research objectives.

What are the usages and benefits of secure and cost-effective CC services adoptions?

1. What are the significant factors in organisations adopting CC technology?
2. How do these factors affect an organisation's objective to adopt secure and cost-effective CC services?
3. Can the size of an organisation establish the connections between the factors and an organisation's intent to implement secure and cost-effective CC services?
4. What is the difference between the CC services adopter and non-adopter businesses in regard to the influence of secure and cost-effective CC services factors?

Secure and cost-effective CC services benefits businesses by reducing initial capital investment, higher productivity, reducing the cost of system maintenance and IT costs (such as IT personnel) and operating costs, reducing investments in new infrastructure, and eliminating the cost of upgrading software.

1.7 Scope of the Study

The critical research point is to investigate and examine the factors affecting the evaluation and securing of CC services adoption. Firstly, identify the factors and subsequently investigate their effects and relationships. The study outspreads a conceptual model to understand the influence and intention of secure and cost-effective CC services adoption factors.

To validate a better understanding of the conceptual model and how the proposed research model can predict factors influencing cost-effective and secure CC services adoption (see figure 5.1). Factors that affect secure CC services adoption have been assessed by collecting

quantitative and qualitative data using survey questionnaires and interview methods, respectively. The quantitative and qualitative results have been validated using collected data through an online survey and interview method. Furthermore, the open question technique has been used in the survey and the interview technique to explore factors not covered in the proposed model.

1.8 Research Gap

CC is still a gradually growing industry with competing providers and services. However, a secure CC services adoption evaluation platform is necessary. Previously much work has been done, but still, there is a need to explore this respect further. Tremendous confusion and gaps exist between practices, theories, and cost-effective and secure CC services (Omar et al., 2020). Secure CC services adoption evaluation and guidelines have become a worldwide research topic. Some of the findings through Systematic Literature Review (SLR) identify several research gaps in secure CC services adoption, such as compatibility, security, complexity, resources, and evaluation which could be long-term challenges.

In this study, the users will be focused (either using CC services or not), and providers that try to determine the CC services adoption process with a decision to adopt it. This research gives guidelines for the IT CC services adoption process.

Threats associated with CC services adoption decision are mentioned below:

a. Lack of threat domain knowledge and professional expertise.
b. Less contribution of practical experience, especially in SMEs businesses.
c. Need for adequate knowledge about secure and cost-effective CC services.
d. Lack of correct management adoption decisions on cost-saving, data security, and reliability of services. CC services for organisations offers immediate visible economic benefits, such as cost-saving for IT infrastructures, operation, and flexibility in service.

This research has four main motivations to address the research gap:

a. To develop a conceptual model and support decision makers according to their requirements at each decision-making level when considering adopting a CC services platform.
b. To investigate and examine the factors of evaluation and secure CC services adoption, which influences organisational decision-making for evaluated, and secured CC services adoption in technologically developing environments. To identify whether the drivers and barriers to cloud adoption are the same as those faced in technologically developed environments.
c. A critical evaluation of the issues and the benefits related to CC services adoption.
d. A critical evaluation of the existing frameworks and respective models which support CC services adoption.

This research aims to fill the gap in the literature, provide evaluation support, and secure CC services adoption in technologically developing and developed contexts.

1.9 Contribution to Knowledge

This research makes several contributions to academic knowledge and practice. The research principal contribution is to meet the main aim by developing guidelines for a secure and cost-effective CC services framework to support CC decision-making and those already using it. A significant secondary contribution is that this research adds to the body of knowledge on the evaluation of CC services adoption guidelines for secure and cost-effective CC services.

More specifically, the contributions to the knowledge of this research can be summarised as follows:

- An empirically investigated knowledge management based guidelines for CC decision-making framework, with supporting models and tools, to support CC adoption decision.
- An empirical investigation into the factors which influence organisational decision-making for CC in the technology of large organisations and SMEs.

- A critical review of the issues and benefits related to the adoption of CC services in large organisations and SMEs.
- A critical review of existing frameworks and models which support CC adoption in large enterprises, and SMEs.

1.10 Thesis Structure

This study has been divided into eight chapters, the contents of the chapters are summarised as follows:

Chapter 1: Discusses the background and the motivation of the research; discussion of the background, motivation, and aim/objectives are established and discussed the research question, the scope of the study, the research gap, and knowledge contribution.

Chapter 2: SLR offers CC and CC methodologies in a different framework. Discusses selected articles based on databases, articles publication continent, year-wise, and channels published to support CC adoption.

Chapter 3: Discusses the history, definitions, challenges, and research security issues on cloud database benefits, CC adoption, examining cloud service, and CC adoption deployment model.

Chapter 4: The chapter discusses research methodology, identifying the range of research approaches and methods, and understanding the enterprise's challenges. Discusses several CC adoption concepts, qualitative and quantitative approaches. Planned to use the mixed method based on qualitative and quantitative for this research.

Chapter 5: Significant factors, findings, and variables related to CC services adoption include environmental, human, organisational, and technological characteristics. Accomplished objective by developing research model which delivered significant elements in CC adoption, presented mixed methodology in the study, i.e., the qualitative and quantitative. Hypothesis construction discusses, and their outcome based on the SLR.

Chapter 6: In the first phase, qualitative analysis findings are presented based on interviews. This chapter's findings help with the survey questionnaire design as well.

Chapter 7: The second phase presented the quantitative analysis on a survey-based questionnaire. To extract analysis an in-depth analysis and test the hypotheses.

Chapter 8: The thesis concluding chapter discusses the research's main findings and how they facilitated accomplishing the research objective. Investigators discusses research outcomes implications in Chapters 6/7 in small, medium, and large enterprises regard to decision-makers and CSPs. Finally, the chapter conclude by addressing research boundaries and identifying areas for future research.

1.11 Conclusions

This chapter provides a background of the study and presents the research aim and objectives associated with the research theme. The chapter has also raised the research questions and has gone through literature that delivers a research phenomenon. The literature reviewed specifies that there is a potential for research on factors affecting CC adoption and to provide a systematic recommendation to support proposing users in the process of CC adoption. Finally, the thesis structure was defined, indicating the research fundamentals and an explanation of the content in the other Chapters. The aftermath of this research will likely support the anticipated users of CC to make a knowledgeable decision about CC services adoption. The next chapter discussed the CC adoption elements based on the systematic literature review.

Chapter 2 - Systematic Literature Review

2.1 Introduction

This chapter aims to evaluate the relevant literature regarding the growing field of CC. Based on the current literature, the main goal is to identify directions for researchers and CC users. Though this study may not be able to specify the benefits of using cloud technology due to the progress in the area so far being made primarily on designs and concept proof, not in an actual use context, we do, however, have identified some better ways of using CC. Study analysis outlines the theory of CC, for instance, CC adoption, CC security, CC overview/objectives, CC challenges, CC factor influencing, CC factor affecting, CC future forecast, CC adoption decision, and CC implementation. This chapter will summarise the outcomes of previous studies and relative analyses and offers the contextual material for the remainder of this thesis.

2.2 Cloud Computing Background.

Due to the size and structure, organisations face many challenges. Compared to large companies, adopting innovations in small firms have less cost tolerance. Organisations are very cost-conscious; their main objective is controlling costs. In contrast, technology adoption helps organisations gain a competitive advantage. Sometimes it involves high costs; the project's actual cost goes higher than the initial estimate (Magne and Kjetil, 2006).

CC helps organisations tackle many issues, such as cost and risk management (Karlis, Darya and Tatjana, 2018). CC has no universal definition, whereas, in this research defined as a computing standard in which the computing resources are allocated to various customers over a network and available by services on demand (e.g., internet) at anytime and anywhere (Marian, Eileen and Gerard, 2012). Cloud computing resources are not restricted to networks, servers, storage, and applications (Magne and Kjetil, 2006).

CC pay-as-you-go payment model allows companies to only pay for the service they have used, and companies do not need to pay upfront to buy, upgrade (hardware/software), install, or license the system. There are some drawbacks, such as those related to the cloud's security, reliability, availability, and legal concerns about the ownership of the data and the location of data centres where data is stored (Gianmario et al., 2014).

Selected study variable are appropriate in the organisation's context. The four factors are environmental, human, organisational, and technological. Each factor comprises one or more constructs. Environmental factor comprises External Support and Competitive Pressure. Human factor includes Senior Management Support and Employee Cloud knowledge. The organisational factor comprises adequate resources and information intensity. Finally, the technological factor comprises CC's Relative advantage, Complexity, compatibility, Security & Privacy, and Cost-effectiveness with the companies norms and Technologies.

CC technology provides data storage and other services at a lower price and very economical. CC technology depends on the model type used: SaaS, PaaS, or IaaS. In addition, the project's cost and risk management also influence the success of the project based on cloud technology. A well-adopted cloud gives the organisation many advantages, such as easy and pervasive access to data and applications, increased cost-effectiveness, and competitive advantage (Mohd, Roslina and Suriayati, 2017).

The survey data is quantitatively analysed, whereas interviews are analysed qualitatively. Factor analysis and reliability checks are performed to check the questionnaire's internal convergent, discriminant validity.

2.3 Research Systematic Literature Review.

An SLR was conducted on enterprise cloud-based adoption solutions. The primary goal was to identify the factors, and challenges from existing literature, that influence organisations' CC adoption services process and areas that have been researched for the adoption (Rania, 2016). Organisations considered CC adoption a cost-effective, secure use of information and communication technologies. The organisations' objectives are to improve cooperation, coordination, and quality of business services and reduce different types of IT services costs by using CC services effectively and securely (Ronald and Russell, 2010), p.34-37, (Peter et al., 2011).

SLR is an imperative research process that facilitates identifying areas and their respective issues in which more research is needed (Jane and Richard, 2002). Followed review process within certain boundaries using fundamental guidelines for conducting a successful SLR (Jane and Richard, 2002), (Yair and Timothy, 2006), (Jan et al., 2009)

The main features that differentiate an SLR from a traditional literature review are:

- SLR addresses the specified research questions by defining a review protocol.
- SLR defines the search strategy that aims to detect as much of the relevant literature as possible.
- SLR requires inclusion and exclusion criteria to assess each potential primary study.

The guidelines and systematic process adopted in this research work (Barbara et al., 2007). The systematic review was conducted mainly in three phases:

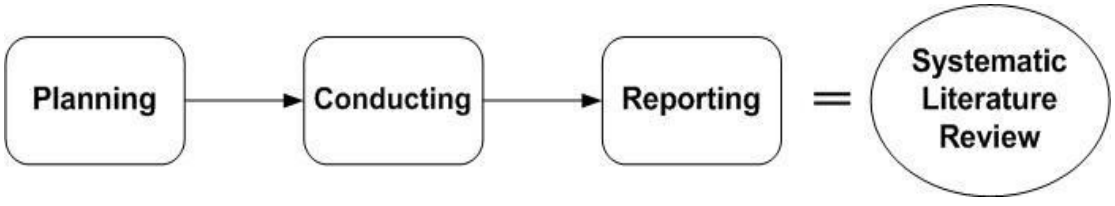

Figure 2.1: Systematic review phases.

- **Planning the review:** Associated with the identification of the need for a review and developing the review protocol.
- **Conducting the review:** Associated with selecting of primary studies, quality assessment, data extraction, and data synthesis.
- **Reporting the review:** Reporting the results and documenting the process.

The CC services offers a business solution, a few well-known cloud examples, such as Amazon, Google, and Microsoft (Department of Finance and Deregulation (DFD), (Govt. of Australia, 2011), (Khong, Uchenna and Siong, 2012), (Ishan et al., 2018).

2.4 Systematic Literature Review (SLR) Guidelines.

SLR guidelines related to the subject area (Barbara et al., 2007) were followed for technology-related issues. Identified by include/exclude and quality assessment criteria, a selected set of articles was available for the data extraction. Categorised reviewed articles according to research methods used to precisely determine the extent of CC adoption research (Wanda and Jack, 2001), (Robert and Frank, 1987), (Rafael, 2007). Applied research methods in reviewed articles included journals, articles, case studies, surveys, research papers, conceptual papers, press releases, workshops, PhD theses, conference publications, and books chapter (11 types of articles) in related areas. Some articles did not have any methodology section, but they reflect on some concepts about CC (e.g., cost, security, performance, etc.), or they adopt theories without empirical testing.

These types of papers are labelled as conceptual papers.

Classification of the 85 selected articles in manufacturing, health, education, warehousing, engineering, telecommunication, construction, and research sectors involved using a thorough and theoretical analysis of the relevant topic as suggested by (Joost, Elfi and Celeste, 2013), (Kanika, Wasana and Gable, 2016). Therefore, the classification process resulted in 11 corresponding variables (i.e., external support, competitive pressure, senior management support, employee cloud knowledge, adequate resources, information intensity, relative advantage, complexity, compatibility, security/privacy, and cost-effectiveness). Finally, applied selective coding was to integrate and refine the four main categories (environmental, human, organisational, and technological) and their 11 respective variables to develop relationships between them (Joost, Elfi and Celeste, 2013), (Kanika, Wasana and Gable, 2016).

CC services adoption keystones are the IT knowledge, competence, and capability senior management needs to create a suitable organisational environment. Such environments must offer sufficient budgets, adequate human and IT resources, and more time (Sangeeta and Prerna, 2012), (Hans et al., 2013), (Yazn, Savvas and Teta, 2013), (Nouf et al., 2014). This involves:

1. Understanding CC, architecture, service models, & strategic values (Usman and Mahmood, 2011), (Espadanal and Oliveira, 2012), (Supriya, 2015), (Ashwini et al., 2012), (Subhas and Arka, 2010);
2. Identifying an enterprise's business needs & aligning IT decisions with business strategies (Brian and B.Donnellan, 2013), (Ruoning and Prashant, 2014);
3. Existing IT infrastructure readiness evaluation of the readiness, IT knowledge, human resource skills, available resources, and culture (Ashwini et al., 2012), (Luoma and Nyberg, 2011), (Hans et al., 2013), (Espadanal and Oliveira, 2012);
4. Steering towards CC services adoption (e.g. deciding on an adoption strategy, governance of integration, implementation, and evaluation of CC services after use) with the guidance of external regulatory & professional bodies (Morgan, 2013), (Brian and B.Donnellan, 2013).

These benefits comprise cost savings, agility, flexibility, ease of use, scalability, the ease of cooperation between business partners, based on less operational effort on the part of CIOs, and increased productivity (Hans et al., 2013), (Suresh and Krishnan, 2012), (Sangeeta and Prerna, 2012), (Mathews and Duy, 2013), (Angela and Nan-Chou, 2012), (Ruoning and Prashant, 2014), (Prashant, Seetharaman and John, 2013), (Ugochukwu and Benedict, 2012).

In the concept of CC services proofing, enterprises can identify risks and benefits to decide whether or not to adopt CC services. The identified risks include organisational risks, technical risks, legal risks, non-technical risks, performance risks, and security risks (Ugochukwu and Benedict, 2012), (Meiko et al., 2011), (Mathews and Duy, 2013), (Angela and Nan-Chou, 2012), (Hasan, 2011), (Easwar et al., 2013), (Maricela, 2014).

2.5 Systematic Literature Review Methodology.

SLR requires a comprehensive, fair analysis of searched literature. It maximises the extent of searched literature that identifies some of the most likely used alternative words, concepts and synonyms in research, (Rafael, 2007). Firstly, a manual search was conducted in computer science and businesses. The literature review search process used eight quality scholarly selected types of databases. These databases facilitated more broad scope and open access, leading to an Information System (IS) and 11 articles in the areas (Yair and Timothy, 2006). In contrast, online databases are helpful and practical sources for reviewing literature about a modern-day phenomenon such as CC (Haibo and Mary, 2012).

The year of publication must be unrestricted since CC adoption was proposed only in the last eleven years (i.e. 2009 to September 2020). The search criteria were limited to the 11 types of articles to ensure their relevance. After the general study of related areas, the language was limited to English. Furthermore, the search string terms that are used for searching all eight types of databases were CC in combination with adopt* and other respective related terms, such as accept*, cost*, diffuse*, security*, secure*, evaluation*, and guidelines*.

The initial search string in all the mentioned databases resulted in 561 articles. The preliminary evaluation involved reading the abstract and the table of contents of selected articles to decide whether or not they are relevant to this review (Jan et al., 2009), (Chitu and Kira, 2010). Table 2.1 specified evaluation criteria. Whereas filtering criteria excluded recurring papers, research-in-progress, and non-English language papers, focused on individuals, periodical articles published by news websites, trade journals, and magazines. The inclusion criteria were applied to select the articles and books for each author. Criteria helped to delimit the sample of articles so that the literature review is practically manageable (Chitu and Kira, 2010). The process of evaluation selected 85 articles for thorough study, and articles classification was included in the reference list as seen below:

Include criteria	**Exclude criteria**
• Directly or indirectly related to both businesses and cloud technology. • Cloud-based businesses frameworks design. • CC solutions applied in businesses. • Security and privacy mechanisms of businesses data in cloud. • Written in English.	• Irrelevant to study of the cloud or businesses. • Conceptual methods or cognitive introductions. • Review papers. • Business analysis reports. • Not written in English.

Database	Total No. of Research	No. of Excluded Studies	No. of Selected Studies	Percentage of Selected Studies
ACM Digital Library	64	52	12	18.75%
IEEE Xplore	83	70	13	15.66%
Inspec	45	34	11	24.44%
Springer Link	101	87	14	13.86%
Google Scholar	81	71	10	12.35%
Google Books	35	33	2	5.71%
Researchgate	65	51	14	21.54%
Wolverhampton University Online Library	87	78	9	10.34%
Total -->	561	476	85	15.15%

Table 2.1: Selected articles based on search Databases.

2.5.1 Continent Wise Publications

Geographical publications classification across five Continents highlights that Asian Continent has the highest number of research articles, with 40%. In the second position, Europe Continent has articles at 30.59%. In the third position, the American Continent has articles 20%. In the fourth position, the African Continent has 5.88% of the articles, and finally, the Oceania Continent has articles 3.53%. Table 2.2 reflects the Continent-wise research articles published, which shows that Asia, Europe, and America have a significant share in research. In contrast, Africa and Oceania have a proportionally lower share of the research.

Continents	No. of Articles	Percentage
Asia	34	40.00%
Europe	26	30.59%
America	17	20.00%
Africa	5	5.88%
Oceania	3	3.53%
Total -->	85	100.00%

Table 2.2: Continent wise publications.

Table 2.3 shows Asia has an overall 40% total articles contribution. Within Asia, India is top on the list with 38.24%, followed by Malaysia with 35.29%, and Taiwan in the third position with 5.88%. Whereas Bangladesh, China, Jordan, Pakistan, Saudi Arabia, Singapore, and Vietnam were 2.94% of one article published, respectively.

A. Asian Continent

Countries	No of Articles	Percentage
India	13	38.24%
Malaysia	12	35.29%
Taiwan	2	5.88%
Bangladesh	1	2.94%
China	1	2.94%
Jordan	1	2.94%
Pakistan	1	2.94%
Saudi Arabia	1	2.94%
Singapore	1	2.94%
Vietnam	1	2.94%
Total -->	34	100.00%

Table 2.3: Asian Continent publications.

Second, Table Europe has a 30.59% article published contribution internationally. Table 2.4 shows the UK is on top with 30.77%, surprisingly in second position Ireland with 11.54%. In the third position are France, Portugal, Austria, and Germany, with 7.69% of one article in each publication showing interest in CC.

Finland, Italy, Latvia, Norway, Romania, Scotland, and Slovenia play a secondary role by contributing 3.85% each in the publication for our analysis.

B. Europe Continent

Countries	No of Articles	Percentage
UK	8	30.77%
Ireland	3	11.54%
Austria	2	7.69%
France	2	7.69%
Germany	2	7.69%
Portugal	2	7.69%
Finland	1	3.85%
Italy	1	3.85%
Lativa	1	3.85%
Norway	1	3.85%
Romania	1	3.85%
Scotland	1	3.85%
Slovenia	1	3.85%
Total -->	26	100.00%

Table 2.4: Europe Continent publications.

Table 2.5 shows that the American Continent has a 20% contribution internationally. The U.S. dominates the research with 94.12% of the articles and a very marginal role in Canada with 5.88%.

C. American Continent

Countries	No of Articles	Percentage
USA	16	94.12%
Canada	1	5.88%
Total -->	17	100.00%

Table 2.5: American Continent publications.

The African Continent represents in Table 2.6, has a 5.88% article publication share internationally. Kenya is at the top of the list with 40% secondary publication role, followed by Ghana, Nigeria, and South Africa contributing with 20.00% each.

D. African Continent

Countries	No of Articles	Percentage
Kenya	2	40.00%
Ghana	1	20.00%
Nigeria	1	20.00%
South Africa	1	20.00%
Total -->	5	100.00%

Table 2.6: African Continent publications.

Oceania Continent publication contributions are shown in Table 2.7, with 3.53% internationally at the bottom. Australia is the only country that contributed to this continent that published three articles.

E. Oceania Continent

Country	No of Articles	Percentage
Australia	3	100.00%
Total -->	3	100.00%

Table 2.7: Oceania Continent publications.

2.5.2 Publication Year Distribution

Table 2.8 shows the yearly basic data of the selected primary articles as time restriction applied to the study found that no significant articles were published before 2009. The CC term was coined in 2006, and at the end of 2008, most researchers started to consider this vital topic widely. Therefore, the year of articles considered in our research is limited to a range from 2009 to September 2020.

The study covers the eleven years of the period; interestingly, the data's up-and-down flow is encouraging, reflecting that this research area is still going on positively. Found only two articles (2.35%) which were published in 2009, 3 articles (3.53%) in 2010, more interest in the research started in 2011 when seven articles (8.24%) were published, then 11 articles (12.94%) were published simultaneously in 2012, 2013 and 2014. In 2015 publications dropped to 7 articles (8.24%), but in 2016 trend of publications started going up, with nine articles (10.59%), ten articles (11.76%) published in 2017, and finally, 14 articles (16.47%) published in the first three quarters (i.e., up to September) of 2018.

Surprisingly this shows a good increase in the number of publications each year, which suggests a growing interest in CC adoption. It also shows that trust is developing in the CC environment, and more companies are confidently using or intend to use this technology soon.

Years	No. of Articles	Percentage
2018	14	16.47%
2017	10	11.76%
2016	9	10.59%
2015	7	8.24%
2014	11	12.94%
2013	11	12.94%
2012	11	12.94%
2011	7	8.24%
2010	3	3.53%
2009	2	2.35%
Total -->	85	100.00%

Table 2.8: Articles years.

2.5.3 Publication Channel

Table 2.9 shows the selected articles from different types of publications. In this study, publication type means the channel where the selected articles have been published. Publication types included in this study, for instance, conferences, journals, articles, conceptual papers, research papers, surveys, case studies, press releases, Ph.D. thesis, publications, workshops, and book chapters, cover every aspect of the study regarding CC adoption. Interestingly the majority of the articles were published in conferences 33 (38.82%), the journals are second, 23 (27.06%) publications, and the third position is held by articles 15 (17.65%) publications. Whereas conceptual and research papers were 3 (3.53%), each published accordingly. The rest of the selected articles published are not encouraging in numbers, such as surveys 2 (2.35%) publications, case study, press release, Ph.D. thesis, publication, book chapter, and workshop selected 1 (1.18%) each published respectively.

Publication Type	Publication Type	No of Articles	Percentage
CON	Conferences	33	38.82%
JOR	Journals	23	27.06%
ART	Articles	15	17.65%
CP	Conceptual Papers	3	3.53%
RP	Research Papers	3	3.53%
SUR	Surveys	2	2.35%
BK	Books	1	1.18%
CS	Case Study	1	1.18%
PRL	Press Release	1	1.18%
PTH	PhD Thesis	1	1.18%
PUB	Publications	1	1.18%
WRK	Workshop	1	1.18%
	Total articles selected -->	**85**	100.00%

Table 2.9: P**ublication types.**

2.5.4 Classification of the Relevant Articles

Table 2.10 presents the classification of this study's relevant selected primary articles. The study identified that most selected articles were related to CC adoption (such as 30 with 35.39%). Data shows that businesses are still interested in adopting CC instead of traditional IT.

The study identified that the importance of CC security (18 with 21.18%) is still in business priority; therefore, security is essential for a safer environment. A substantial part of the articles on security highlights a series of new adoption problems.

The third factor of businesses is the CC overview/objectives (such as 8 with 9.41%), which reflects that they are keen to know the pros and cons before adoption. The CC challenges and factor influencing (such as 7 with 8.24%) are both at the same priority while considering the CC adoption respectively for the safer utilisation of the platform. Data reflects that researchers have an interest in the challenges and factors influencing the CC adoption consideration.

This study's important element is that CC adoption-affecting factors have also been considered (6 with 7.06%). The consideration of CC adoption for the smooth running of the business environment is manageable and needs attention from the researcher.

Another factor the researcher considers is CC's future forecast (such as 4 with 4.71%) to keep an eye on the trend of this technology. Considered CC adoption decision is marginally low (3 with 3.53%) as more research needs to be done. Finally, CC adoption & implementation is still needed attention from researchers to address this issue as (2 with 2.35%) need more work in this area.

Selected studies	No. of Articles	Percentage
CC Adoption.	30	35.29%
CC Security.	18	21.18%
CC Overview / Objective.	8	9.41%
CC Adoption Challenges.	7	8.24%
CC Adoption Factor Influencing.	7	8.24%
CC Adoption Factor Affecting.	6	7.06%
CC Future Forecast.	4	4.71%
CC Adoption Decision.	3	3.53%
CC Adoption & Implementation.	2	2.35%
Total -->	85	100.00%

Table 2.10: Selected Studies.

2.6 Conclusions.

CC is a technology for providing different IT services that contain rental resources in the cloud. The most common task is increasingly conducted online: checking emails, social media communication, editing and writing different documents, collaborating, watching videos, and creating images. The study reflects the trend of research on CC adoption internationally. Therefore, the SLR study is mainly aimed at identifying the different factors for CC adoption by organisations in different sectors internationally.

CC is increasingly being adopted by many manufacturing, health, education, warehousing, engineering, telecommunication, construction, and research sectors. Our analysis shows that almost all the articles, even in different sectors of CC adoption, have at least addressed issues related to adoption. SLR findings notably revealed that the utilisations of CC by companies is still an ongoing process in different sectors. Indeed, it was also clear that there is a different level of CC adoption by the companies in SME enterprises. Our findings have shown that internationally CC adoption is still an ongoing process at a different level in the companies because some organisations have almost limited resources and financial capabilities to invest in IT.

However, significant security factors influencing/affecting and challenging issues to remain. These issues are analysed in most cases, which need to be tackled before CC services are effectively used by organisations. Even though the SLR could not declared to be comprehensive, it still offers suitable awareness and allows amount of research on CC Adoption in SMEs.

Strategically, the effective use of CC in future organisations competition still needs to be improved. Whereas standards are lacking, such as unified Application Programming Interface (APIs) and interoperability of various systems, which are not yet granted. Therefore, the analysis of business impact looks at an early stage, and the assessment of benefits is not yet correctly mature.

Chapter 3 - Cloud Computing Related Research

3.1 Introduction.

This chapter reviews the main concerns related to this research and emphasises CC and adoption models for SMEs, large enterprises, and the associated services delivered. The chapter instigates an overview of CC that underpins this research. The prospective benefits of CC, specifically for SMEs and large enterprises, and issues associated with CC are also presented. The overview and the prominent need for CC by SMEs and large enterprises are briefly discussed. The theoretical structure for exploring the issues that influence SMEs and large enterprises' decisions to adopt CC is described to clarify the recognised literature gap.

3.2 Cloud Computing Important Security Issues.

CC provides a range of operational resources. Security techniques and challenges/issues generally perceived as enormous in CC also lead the users to resist utilising the technology of CC (Nabeel and Adil, 2016). Below are discussed some of the security challenges/issues.:

3.2.1 Integrity: Integrity ensures that data held in a system is a proper representation of the intended data and that an unauthorised person has not modified it. When an application runs on a server, a configured backup routine is to be safe in case of a data loss incident. Usually, the data will back up to any portable media regularly and be stored in an off-site location (Saeed, 2015).

3.2.2 Availability: Availability ensures that data processing resources are not made unavailable by malicious action. It is a simple idea that something is available when a user tries to access it (Saeed, 2015).

3.2.3 Confidentiality: Confidentiality ensures that data is not disclosed to unauthorised persons. Confidentiality loss occurs when data can be viewed or read by any individuals who are unauthorised to access it. Loss of confidentiality can occur physically or electronically, and confidential physical loss occurs through social engineering. Electronic confidentiality loss occurs when the clients and servers are not encrypting their communications. (Saeed, 2015).

3.3 Cloud Database.

A cloud database is a service built, deployed, and delivered through a cloud platform. It is primarily a Cloud Platform as a Service (PaaS) delivery model that allows organisations, end users, and their applications to store, manage and retrieve data from the cloud.

3.3.1 How Does Cloud Database Works?

The CC model promises on-demand and subscription-oriented services through the internet to host respective applications and process user workloads accordingly. To ensure the availability and reliability of the required services, the respective components of Cloud Data Centers (CDCs), such as network devices, storage devices, and servers, should be running 24/7. The CC facilitates the creation of a large amount of data, for instance, data streaming, file sharing, searching, and social networking websites (Rajkumar and Sukhpal, 2018).

A cloud database exists on servers and storage provided by a cloud or database as a service (DBaaS) provider, and the internet is the only means of access (Swarnalata and Kamal, 2015). Any software application, e.g., a SQL database residing either on-premises or in the cloud, should appear the same.

3.3.2 The Lifecycle of Cloud Data

The following describes the lifecycle of data in the CC at different levels (Gerard and Edward, 2012):

1. **Data Creation/Transmission**- At this level, the user initially creates the data and then pushes it to the cloud for consumption.

2. **Data Reception** - At this level, the cloud receives data before being written to storage and taking activity logs.

3. **Output Preparation** - This is the preparation stage of data returned to the consumer. Includes any data transformation actions that need to be performed before its return e.g serialisation.

4. **Data Retrieval** - At this stage, the consumer receives the data from the cloud, and then it is within the user domain.

5. **Data Backup** - For archival purposes, the CSP replicates data. The process may involve transferring the data copy to an external store.

6. **Data Deletion** - The data is deleted permanently from the cloud.

3.4 Cloud Database Benefits.

A traditional database operates on an on-site physical server and storage architecture.
However, a cloud database offers the below mentioned distinct advantage:

- **Elimination of physical infrastructure.** CC database environment enables companies to provide computing resources through a CSP (Gerard and Edward, 2012). The CC provider of servers, storage, and other infrastructure is responsible for the maintenance and availability.
- **Cost savings.** Cost saving by eliminating a physical infrastructure owned and operated by an IT department. There are significant savings achieved in different forms, such as reduced capital expenditure, less staff, decreased electrical and operating costs, etc., (Colin and Felicia, 2016).

3.5 Cloud Computing Adoption.

The CC offers an alternative for organisations that intend to refrain from investing in in-house IT resources, (Tiago, Manoj and Mariana, 2014), (Majid, Elhadj and Khawar, 2018). Consumers benefit through a particular service model, the means for manipulating information, over the internet, according to its current needs (Teófilo, Filipe and Alfonso, 2017). There are three essential benefits of CC (Anabel and Lumsden, 2014):

a- Cost reduction relates to removing IT infrastructure in the organisation alongside its direct and indirect costs.

b- Resource rationalisation in which the service is dynamically scalable because the users only utilise the computing resources they require.

c- Portability through which any particular feature can be accessed not only from a connected computer to the internet but also from any device, e.g., mobile phones, tablets, laptops, or desktop computers, and from any particular geographical location.

3.6 Cloud Computing Service Models

CC services are provided through four different service models: Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Database as a Service (DBaaS).

3.6.1 Software as a Service (SaaS): In the SaaS layer function as a software delivery model, the CSP infrastructure hosts the software on their servers, which the end user can access through a web browser (Michael, 2014). The software's installation, management, and licensing are not the end-users responsibility (Mariana, Alta and Paula, 2011). However, as CSP manage it, SaaS model users have no control over data and infrastructure (Tharam, Chen and Elizabeth, 2010). Enterprises benefit by reducing operating costs through the adoption of SaaS services.

3.6.2 Platform as a Service (PaaS): PaaS provides the combination of both infrastructure and application by CSP to facilitate the user to develop and deploy their respective applications (Jyoti, 2013). Hence, the PaaS underlying operating system, storage, and CSP managed network infrastructure. In addition, the users have control over their applications and respective data (Sumit, 2014), (Mariana, Alta and Paula, 2011). PaaS facilitates the user to follow the complete software development life cycle, from as planning to deployment of the software.

3.6.3 Infrastructure as a Service (IaaS): The IaaS layer is a computing paradigm offered by CSP over the network. This layer provides computing infrastructure service resources like storage, virtual machine (VM), and Central Processing Unit (CPU) (Jyoti, 2013). The main advantage of the VM is to play the role of the server, so the VM has the same capability as the in-house server. With PaaS and SaaS on physical infrastructure, users have no control, whereas IaaS provides user control of the operating system and storage (Sumit, 2014). That edge over SaaS and PaaS in terms of security and control over the resources.

3.6.4 Database as a service (DBaaS): DBaaS means database outsourcing in which deployed client database on the cloud environment. That is to be maintained by the service provider; due to this it reduces the overheads of installation, storage, and maintenance of the database on the client machine. Database as a service provides services in two ways (Swarnalata and Kamal, 2015).

1. Buy the IaaS from the CSP. Deploy our choice of database, maintain it, and use it as per our need

2. The client subscribes to DBaaS and needs to connect our application with the database; the service provider will do the rest.

3.7 Deployment Models of CC.

CC deployment model by NIST (Peter et al., 2011)**:**

3.7.1 Public cloud. The cloud infrastructure is owned, managed and operated by a business, academic institution, government organisation, or some combination, and it exists on the cloud provider's premises (Peter et al., 2011).

3.7.2 Private cloud. The provisioned cloud infrastructure for exclusive use by a single organisation comprising multiple consumers (e.g., business units). Owned, managed, and operated by the organisation, a third party, or some combination of them, and it may exist on or off-premises (Peter et al., 2011), (Sumit, 2014).

3.7.3 Hybrid cloud. The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities (Peter et al., 2011), (Sumit, 2014). However these are bound together by standardised or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

3.8 Challenges of Cloud Computing Adoption

There are several benefits of CC; however, numerous challenges also need to be addressed before it can be recognised as a feasible ICT choice for organisations (Omar et al., 2018). Here are many challenges related to CC services adoption (Mohammed et al., 2019). Some of the widely reported challenges are mentioned below.

3.8.1 Security and Confidentiality

The applications and data of the customers are vulnerable to different security threats like data loss and unauthorised access, which result in a lack of control over cloud data and infrastructure (Constantinos, Wietske and Jieun, 2013), (Zhang, Cheng and Raouf, 2010). Although the CSPs assure customers that they use professional experts to manage their data centres, the customers still need to be more concerned about who is monitoring and managing their confidential data. Therefore, to ensure data confidentiality, the following techniques are applied to overcome the security and privacy challenges:

- Encryption:
- Digital signature:
- Identification and authentication:
- Authorisation:
- Integrity and confidentiality:
- Non-repudiation:
- Direct contact with the service provider:
- Gradual sequence of migration:
- Investigating the vendor:
- Data splitting:

3.8.2 Availability

Availability ensuring cloud service or resources implies that a customer's request is granted instantly, and the requested service is delivered immediately (Nouf et al., 2014). A steady and good quality internet connection will eliminate service outage and increases the availability and accessibility of the services. The provider guarantees high service availability to customers, (Pramod, Anil and Srinivasa , 2013). This factor is determined by reliability, latency, and performance.

3.8.3 Performance

The third most significant issue to be considered is performance, which affects CC services adoption. It is usually determined by the application's capabilities running on the cloud (Theo et al., 2018). Sometimes distance and internet factors also affects the performance of a cloud system between the cloud and the customer because of delay (Mohammed et al., 2019).

3.8.4 Costing Model

CC can reduce the infrastructure cost, but the high use of network resources such as data usage and bandwidth will increase the data communication cost (Tharam, Chen and Elizabeth, 2010). The higher cost of computing resources relates to more use of resources for data exchange between providers and organisations. The cloud pricing models include pay-as-you-go and subscription pricing (Constantinos, Wietske and Jieun, 2013).

3.8.5 Compliance and Physical Location

In CC, the location of data is not known by a customer or may not have control over the location, which creates legal issues with regulatory and privacy laws (Joep and Martijn, 2007), (Jatinder et al., 2015). Many EU countries and the USA do not permit certain types of data to be moved out of their countries. For example, customers who have their cloud data stored in the USA should comply with rules concerning the storage and disclosure of data.

3.8.6 Service Level Agreement (SLA)

The contract between CSP and customer is called SLA, which specifies what services the provider will offer and up to what level. SLA is documentary evidence that guarantees the provider's efficient delivery of cloud services and resources. Such as ensuring the quality, availability, reliability, and performance of the services (Tharam, Chen and Elizabeth, 2010), (Constantinos, Wietske and Jieun, 2013).

3.9 Advantages of Cloud Computing

The CC description is a new paradigm characteristic (e.g. virtualisation), (Yogesh, Michael and Nripendra, 2012). Whereas in the early days of computing, these features were only available to large organisations or in mainframes, nowadays, CC makes IT resources possible for everyone (Margaret and Trisha, 2012). Therefore, the discussion about CC offers many valuable benefits for both individuals and enterprises from different aspects, namely technical, economic, security, and organisational.

3.9.1 Technical benefits

CC is considered a revolution for enterprises in delivering IT services with new and emerging technology (Tharam, Chen and Elizabeth, 2010), (Maricela, 2014). CC reshapes the existing technology to support business in the following dimensions:

- Improved IT efficiency.
- Better IT utilisation.
- Accessibility.
- Faster access to IT resources.
- Innovation.
- Green IT.

3.9.2 Economic benefits

The cost benefits of reliable IT services are a barrier to some SMEs in traditional IT environments (Douglas, 2010). IT services offered by CC can be provided at a reasonable cost, resulting in several economic benefits that can be obtained when adopting CC, (Federico, 2009).

The CC facilitates organisations to work, in general, on a "pay-as-you-go" basis, giving the option to the user to pay for what they use (Jun and Mohammed, 2013). As a result, CC adoption by SMEs offers slow start-up costs (Evangelia, Persefoni and Christos, 2014). In this respect, CC can add value to enterprises by using cloud-based quality services at a lower cost and, in the short term allowing an enterprise to increase return on investment (ROI).

3.9.3 Security benefits

A key consideration when moving to a cloud solution is identified security (Dimitrios and Dimitrios, 2012), (Maricela, 2014), (Mariana, Alta and Paula, 2011). Furthermore, it discussed that moving to CC may improve enterprise security, as CSPs can also offer better security:

- Better IT capability.
- Backup and disaster recovery.
- Centralised Data Storage.
- Monitoring of Data Access.
- Virtualisation.

3.9.4 Organisational benefits

The benefit of CC architecture is that it supports the autonomic provisioning and release of computing resources without human interactions (Subhankar, 2012). CC could help in allocating computing resources in a short period to provide advanced applications and services. Finally, adopting a public or hybrid cloud minimises the risks of managing IT resources (e.g. in upgrading, updating, backup, and uptime) by moving to the CSPs and making resources available rapidly.

3.10 Conclusion:

This chapter reviewed CC adoption by SMEs and large enterprises and its context. We have clarified the different service delivery and main advantages which act as the critical drivers for CC adoption services explained under the heading advantages of CC. A widespread review discussed the present review relating to CC adoption by SMEs and large enterprises and presented the difference between cloud types. The research has accomplished that although different frameworks are available to support CC services adoption, the following step used an interview questionnaire to identify the CC adoption process. Therefore, in the next chapter, different types of research methodologies were used to develop an appropriate framework to resolve the problems.

Chapter 4 - Research Methodology

4. l Introduction

This chapter outlines the concept, paradigms, and research approaches and discusses the research design and strategies. Methodological expectations lead to the credentials of research approaches and procedures reflected as suitable for gathering adequate empirical evidence. Therefore, the keystone for a formal and practical research study depends on making accurate methodological expectations. Moreover, it discusses the data collection, interview, and survey techniques used in this study.

Empirically testing the conceptual model is based on online surveys and interviews to collect feedback about CC services on four different types of factors and their respective constructs. The survey data is quantitatively analysed, whereas interviews are analysed qualitatively. To check the questionnaire's internal convergent and discriminant validity, factor analysis, and reliability check is performed.

4.2 Research Concept and Paradigms

According to ((Lyn and Harry, 2001), p.1) research is “a scientific and systematic search for pertinent information on a specific topic”. Similarly, ((Kothari, 2004), p. 3) defined research as “the process of finding solutions to a problem after a thorough study and analysis of the situational factors”, (Sekaran, 2010). In this way, paradigms offer directions on how to conduct research to researchers (Sekaran, 2010). A paradigm is “a way of examining social phenomena from which particular understandings of these phenomena can be gained and explanations attempted” (Christine, 2008), p 118. (Mark, 2009), p. 8 Defined paradigm as “a comprehensive belief system, world view, or framework that guides research and practice in a field”.

Research paradigms have three classifications: positivism, critical theory, and interpretivism (Jerry, 2007), (Mark, 2009). In contrast, naming and categorising may vary from scholar to scholar (Mark, 2009). Positivism, critical theory, and interpretivism are the widely reported paradigms (Jerry, 2007), (W.Lawrence, 2014), (Mark, 2009) stated that paradigms further characterised and established some assumptions of essential issues such as epistemology and methodology. The premises offer a comprehensive view of how knowledge is perceived, how knowledge relates to ourselves, and how the ability is discovered (Yvonna, Susan and Eagon, 1994).

- **Epistemology** - The origin of the word "epistemology" is the Greek word "Episteme," which represents "knowledge" (Mark, 2009). Epistemology is "The process of thinking. The relationship between what is known and what is seen. The truths are seen and believed as researchers" (Yvonna, Susan and Eagon, 1994).

- **Methodology –** As a concerned methodology, it is how knowledge is gained. (Creswell, 2014), p. 9, Methodology is defined as "the systematic study of the principles guiding anthropological investigation and how theory finds its application; an articulated, theoretically informed approach to the production of data." Similarly, (Yvonna, Susan and Eagon, 1994), p. 104, Methodology is defined as "the process of how seeks out new knowledge, the principles of our inquiry and how the inquiry should proceed". Questions about methodology are "how can the inquirer (would-be knower) drive finding out about whatever he or she believes can be known?" (W.Lawrence, 2014), p. 108.

Based on the above assumptions, three paradigms are introduced: positivism, interpretivism, and critical theory. These are explained in the following subsections.

4.2.1 Positivism

The French philosopher Auguste Comte (Mark, 2009) established this paradigm. He believed that the assumption of reality exists by natural laws (W.Lawrence, 2014). The positivist "assumes that an objective reality exists out there. The scientist's job is to discover this reality by empirical evidence gathering. Facts can verify with our senses, by seeing, hearing, or touching" (James, 2012). In the opinion of positivists, effects or outcomes are determined by causes (Creswell, 2014). Their approach is to break down ideas into portions to solve a problem, which then can be tested using variables distinctly, hypotheses, and research questions (Creswell, 2014). The positivist ensures the factor's outcome is not influenced during the process (Creswell, 2014).

4.2.2 Interpretivism

Interpretivism assumes that "reality is subjective, constructed by people in their everyday lives" (James, 2012). The ideology of interpretivism is that researchers learn from their everyday lives by conducting research by interacting with people (James, 2012). Qualitative methods preference, such as case studies, observations, and interviews, are believed to be suitable methods of "getting at how humans interpret the world around them." (Mark, 2009), p. 6. Interacting with participants enables the researcher to create meanings from what they see, hear, and understand while conducting the investigation (Creswell, 2014).

4.2.3 Critical Theory

Critical theory assumption is that the factors are affected by reality like cultural, social, ethnic, political, economic, and gender (W.Lawrence, 2014). Thus, critical theorists' research is based on the agenda to reform and improve the participant's life, considering the people's work or life environment and the researcher's life (Creswell, 2014). The critical theory studies a social issue the researchers started, such as "inequality, empowerment, domination, oppression, suppression, and alienation" as the research core aspect (Creswell, 2014). They collaborate in this type of research where participants may participate in designing questions, collecting and analysing data, and benefitting from the research outcome (Creswell, 2014). In other words, critical theory helps individuals to emancipate themselves from "humanly constructed and socially reproduced restrictions" (Ana, Brian and Estela, 2015).

4.3 Research Approaches

For the research purpose, researchers chose deductive and inductive approaches to answer the research questions and accomplish the research objectives accordingly (Christine, 2008). If they want to test the validity of hypotheses or theories, the former is helpful for the researcher. However, to develop new approaches the latter is used (Christine, 2008).

Research studies are classified as either exploratory, descriptive, or explanatory (Jerry, 2007), (Christine, 2008). This classification is for study purposes, usually conducted through research questions (Kothari, 2004). The base of the exploratory study is to investigate a phenomenon or clarify the problem understanding of researchers (Christine, 2008), (Kothari, 2004). Literature research is also the source of exploratory research, observation, interview, or focus groups (Christine, 2008), (Kothari, 2004). The vital aspect of experimental research is flexibility, which means the research direction can change due to new data obtained during the research (Christine, 2008).

The descriptive study focuses on characteristics describing a particular phenomenon under investigation (Christine, 2008). Usually, descriptive study data is collected using surveys, field research, and content analysis (Jerry, 2007). At the same time, establishing and testing causal relationships between variables is dealt with by descriptive study (Christine, 2008). In this case, investigating a problem aims to understand relationships between the variables and explain how and why it happens (Jerry, 2007), (Chitu and Kira, 2010). For the descriptive study, qualitative data may be suitable, but quantitative data is used for the relationship between variables statistically (Christine, 2008).

4.4 Research Design

The research designs are “plans and procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis” (Creswell, 2014). The research design involves choosing a strategy used for problem investigation. The basis of this significant decision is the researcher's assumptions about the study, inquiry procedure, and a particular collection of data, analysis, and interpretation methods. The choice also depends on the nature of the study problem, study audiences, and the personal researcher’s experience. There are three types of research design; they are qualitative, quantitative, and mixed-method designs (Creswell, 2014).

4.4.1 Quantitative Research

Quantitative research measures quantity or amount (Lyn and Harry, 2001). An established approach to the natural science phenomena for collecting quantitative (numeric) data to test any hypothesis or theory (Robert and Larry, 2011). According to (Creswell, 2014) a quantitative research approach for testing objective ideas by examining the relationships among variables. Focuses on developing hypotheses, and quantitative research is based on some theories and particular data collecting using quantitative ways.

The collected data is then analysed to validate certain connections between the specified concepts in the hypotheses. Therefore, quantitative research primarily aims to establish and validate certain relationships between concepts. According to (Robert and Larry, 2011) quantitative analysis follows objective and supposes that one or more reasons likely affect human behaviours. Quantitative research methods are primary tools for surveys and experiments (Creswell, 2014). The survey-designated questionnaire organised an interview method to collect data from a sample as a population representation. In experimental research, the subject matter is grouped into control (Creswell, 2014).

4.4.2 Qualitative Research

Qualitative research relates to qualitative phenomena such as exploring some human behaviour aspects (Lyn and Harry, 2001). In qualitative research, the data (non-numeric) is collected on a particular topic or phenomenon to explore (Robert and Larry, 2011). (Creswell, 2014). The qualitative research approach is “for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The research process involves emerging questions and procedures, data typically collected in the participant’s setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data”.

The qualitative researcher collects data personally from the targeted participants, collected through observation, interview, or document examination. The researcher is each case's "key instrument" (Creswell, 2014). In qualitative observation, the researcher in the study site focuses on individuals' behaviour or activities and takes notes of the activities accordingly. The researcher can participate in or observe the activities. Therefore, qualitative interviews are conducted in different forms, such as face-to-face, telephone, or focus groups (Creswell, 2014).

4.4.3 Mixed Method Research

The third approach the researcher considers is a mixed method (Creswell, 2014). Mixed method research “collects qualitative and quantitative data in one study and integrates this data at some stage.” According to (Robert and Larry, 2011), p. 51, combining two or more research approaches with various strengths and weaknesses in research “you can make it less likely that you will miss something important or make a mistake.” (Creswell and Clark, 2018), Identified multiple reasons for combining quantitative and qualitative research, which include: the validity of findings improving, different research questions answering, explaining results, instrument development, enhancing the credibility of findings, diversity of views, or enhancement of conclusions. Although the quality of the research will improve, the strength of one method will subsequently contribute to the weakness of the other (Robert and Larry, 2011).

There are four main mixed-method designs, these are: convergent, embedded, explanatory, and experimental methods. (Creswell, 2014), (Keith, 2009).

- ***Convergent design*** involves collecting and analysing qualitative and quantitative data simultaneously and combines the results in the interpretation stage (Creswell, 2014). When researchers want to understand the problem better, they use a convergent design method (Creswell and Clark, 2018).

- **In *embedded* design**, Embedded design is used to compare data sources, for the assessment of different research questions, to gain a broader point of view on research issues, explore the concepts before a quantitative study, or explain quantitative findings (Creswell, 2014), (Creswell and Clark, 2018).

- ***Explanatory design*** is a technique that enables the researcher to start with a quantitative design in the first phase, and the second phase uses qualitative design to explain the quantitative findings in more detail (Creswell, 2014).

- ***Exploratory* design** is used in the first phase to generalise qualitative findings with data from a larger collected sample in the second phase. This design is beneficial when the researcher and the respective research problem are more qualitative-oriented (Creswell and Clark, 2018).

4.5 Research Strategy

A research technique is divided into two approaches: qualitative and quantitative. These two approaches are generally used in studies around business and management to distinguish both data-gathering methods and data-analysis processes (Mohamed and Volodymyr, 2016), (Saunders, Lewis and Thornhill, 2009). (Ghosh and Parvesh, 2010) Describe these two categories of data in the form of descriptive accounts of opinions or data considered by sort and as data that can be stated numerically or considered by around numerical value. 'Quantitative' is usually used as a substitute for any data gathering procedure (for instance, a questionnaire) or data analysis technique (for example, graphs or statistics) that presents or uses numerical data (Mohamed and Volodymyr, 2016), (Saunders, Lewis and Thornhill, 2009).

Whereas 'qualitative' is usually used as a substitute for any data gathering methods (for instance, interviews) or data investigation technique (for example, classifying data) that presents or uses non-numerical data (Michael and David, 2002), (Saunders, Lewis and Thornhill, 2009). The survey is one of the leading quantitative approaches now well-accepted in the social sciences (Michael and David, 2002). Quantitative research methods were developed in the sciences to permit researchers to study everyday phenomena.

Using qualitative and quantitative data is supposed to contribute to more substantial results (Pervez and Kjell, 2010). In this research, semi-structured interviews were initially conducted to classify the factors that affect CC services adoption among SMEs and large organisations. According to (Sotirios, 2017), on various occasions, qualitative researchers use qualitative methods in their studies to meet the conditions of quantitative research. Qualitative approaches such as interviews are used in addition to quantitative approaches as a preliminary step for quantitative analysis or to improve conclusions reached through qualitative research (Sotirios, 2017). Also, a qualitative method can deliver in-depth perceptions before running an extensive and costly survey. However, gathering data using only the qualitative technique can be problematic, as using, for instance, semi-structured interviews can limit the generality of the outcomes (Mohamed and Volodymyr, 2016), (Saunders, Lewis and Thornhill, 2009). To overcome this, the interviews were monitored by a questionnaire. The survey was directed to the IT professionals using CC services in SMEs and large enterprises.

After the researcher selects an approach, the next stage is to choose the method or strategy within the given guidelines of practice, which will guide how to conduct the research (Creswell, 2014). Whether it is a research strategy or a strategy of inquiry, both are “types of qualitative, quantitative, and mixed methods designs or models that provide specific direction for procedures in a research design” (Creswell, 2014). The selection of research strategy is usually based on the questions and aims of the research (Christine, 2008).

4.5.1 The Unit of Analysis

The vital part of any research design is determining the unit of analysis linked with the data collection (Evangelia, Persefoni and Christos, 2014). In this study, the factors intend to investigate the organisational level adoption decision on secure CC. Research objectives and the nature of the survey control the unit of analysis.

4.5.2 Quantitative Strategies

Techniques for collecting quantitative data based on quantitative strategies deal with numbers and anything measured. Usually, quantitative approaches adopt a positivist philosophy (Creswell, 2014).

4.6 Data Collection Methods

There are different techniques for data collection, such as survey questionnaires, interviews, focus groups, and observation (Creswell, 2014), (James, 2012), (Christine, 2008), (Kothari, 2004), although, the focus of the study guide is the appropriate selection of technique (Christine, 2008). Moreover, (Keith, 2009), p. 290, stated that "qualitative methods can be strong in those areas where quantitative methods are weak, and similarly that quantitative method can be strong in those areas where qualitative methods are weak. Combining the two methods, therefore, offers the possibility of combining these two sets of strengths and compensating for the weaknesses". Therefore, survey techniques have been chosen to collect data for this study and used in the quantitative designs to collect the research data.

4.6.1 Quantitative Data Collection

A designated quantitative questionnaire technique was used to collect research data. (Kothari, 2004), p. 236. A questionnaire is "a pre-formulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives." A questionnaire is usually one of the efficient and economic data collection mechanisms and is also easy to administer (Kate et al., 2003), (Kothari, 2004). Anyone can personally assist through the mail or electronically (Kothari, 2004). The questionnaire method is used when the researcher recognises what is needed and knows how the factors of interest are evaluated but require good sizeable samples for more dependable and reliable findings (Lyn and Harry, 2001), (Kothari, 2004). Later in this chapter, the questions designed, the pilot study of the questionnaire, and questionnaire administration are discussed.

4.7 Data analysis Method

In Phase-I, Factor Analysis (FA) is used to assess the construct validity of the proposed conceptual model, and in Phase II, logistic regression is used to test hypotheses H1-H11. This method allowed us to predict the essential factors in adopting secure CC services. The dependent binary variable has two distinct values to test the hypothesis for this logistic regression. Furthermore, below briefly discussed these two analysing methods. SPSS (version 26) was used to analyse the data; the analysis method is explained later in chapter 7.

4.7.1. Factor analysis

The construct validity of each model, comprising variables, should be evaluated. Construct validity, which has components such as convergent and discriminant validity, defines the underlying structure of constructs. This method allows a researcher to analyse the correlation between items to determine a new set of highly correlated variables. These new variables are known as factors. Convergent validity is one component of construct validity, which determines whether all items that measure one aspect converge. Factor loading and reliability test are two methods to check the convergent validity of the construct. Factor loading shows the correlation between each item and the related constructs.

A factor loading above 0.5 is acceptable; a factor loading above 0.7 is ideal. The reliability of the construct can also be checked by alpha; an alpha above 0.7 is good (Carol, Albert and Michael, 2012), (Joseph et al., 2010), (Kaiser, 1974). The second component of construct validity that needs to be checked is discriminant validity. Discriminant validity defines whether a construct is different than other constructs. Checking for cross-loading is one way to determine the discriminant validity of constructs. The existence of cross-loading indicates that there is a problem in the model. If an item has a cross-loading with two different constructs, it shows that it does not measure one factor but various factors. Explanatory Factor Analysis is one way to test the discriminant and convergent validity of the instrument. Data drive this type of factor analysis.

4.7.2. Analysis Method

Logistic regression is used to test our hypotheses and predict the adoption of CC services. Logistic regression is a type of regression that is used to explain and predict binary dependent variables. This method allows researchers to identify factors that influence the membership of a subject in a group. It creates a classification system based on which issues can be assigned to different groups. Like other types of regression, such as multiple regression, the coefficient indicates the relative impact of each construct on the dependent variable. The direction and magnitude of coefficients can be interpreted in two ways: original and exponentiated coefficients. The effects of direction can be interpreted from the actual coefficient (negative or positive sign) and the exponentiated coefficient.

An exponentiated coefficient less than 1, has a negative influence, while more than one positively influences the dependent variable. In this analysis method, the dependent variable should be non-metric (having two different values), while independent variables can be both non-metric and metric. One of the characteristics of logistic regressions is that multivariate normality and equal variance are not required. This is often considered the advantage of logistic regression. This researches dependent variable is binary (being an adopter or non-adopter). Logistic regression is used to identify the factors influencing the adoption of CC services. Each variable's coefficient determines the relative impact of each construct on the adoption decision. In the next chapter, we discuss in more detail how this method was applied, and which configurations were used

4.7.3 Data analysis techniques

The statistical analysis undertaken includes the following:

- ***Hypotheses testing:*** Multivariate analysis (MVA) is used to assess three or more variables' relationships simultaneously. Several multivariate statistical techniques exist (e.g. logistic regression) (Phyllis, 2007). In this study, the multivariate analysis techniques are used for a hypothesis-testing component to test the hypothesised model.

- **Scale reliability testing:** The variables in the study are mainly composed of Likert-type items. Therefore Cronbach's coefficient alpha is used to measure the multiple-item scale consistency. Whereas researchers suggest the accepted value is 0.7 for Cronbach's alpha, and a value of more than 0.6 is considered a satisfactory level (Joseph et al., 2010).

- **Multi-collinearity tests:** Multicollinearity occurs when two or more highly correlated independent variables (Julie, 2020). Therefore the chance of computational and interpretational problems is due to multicollinearity (Phyllis, 2007). Thus to overcome this problem, it is recommended that possible multicollinearity is investigated before regression is interpreted. (Mark et al., 2014) If two independent variables are correlated at 0.7 or higher, their analysis may suffer from multicollinearity.

- **Checking for outliers:** Outliers are observations which are substantially different from the other observations, (Phyllis, 2007) such as extreme values on one or more characteristics of variables. In this research, as most variables have been measured with Likert 5-point scores ranging from strongly agree to disagree strongly, the issue of outliers is not a concern.

4.8 Survey

The research based on the survey "provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. It includes cross-sectional studies using questionnaires or structured interviews for data collection, with the intent of generalising from a sample to a population" (Creswell, 2014). The usual strategy is linked to a quantitative approach, although it may be used in qualitative research (Christine, 2008). This method is used because it is economical. The data collection technique is based on a questionnaire that is generally used in quantitative research (James, 2012). Considering the survey data as a standard makes aids both comparison and comprehension (Christine, 2008). Representative data from the population is analysed using descriptive and inferential statistics. The use of computer software during the analysis to test and establish relationships between variables is also very helpful (Creswell, 2014).

4.8.1 Survey Design

Due to the limited time available for this research and the cost, the approaches used to accomplish the objectives of this research were limited to specific qualitative (i.e., semi-structured interviews) and quantitative (i.e., survey) methods (Priscilla, 2005), (Nigel, Nick and Amanda, 2009). The survey is described as one of the generally-used approaches in studies of technology adoption and practice at an organisational level and individual level (Julie, 2015), (Joel and Anil, 2005), (Jyoti and Yogesh, 2005). The survey helps researchers to measure the considerations of participants and their choices about the phenomenon.

These surveys can be conducted in different ways:

- Surveying via emails i.e., in this way, sending a set of questionnaires to the particular respondents with a cover letter that describes the primary purpose of the survey.
- Contacting randomly selected numbers from a telephone directory or any targeted population directory. Then registering their responses by taking a note on the paper or by directly entering them into a specific survey form.
- Face-to-Face surveys are another way of gathering responses in which respondents are asked questions directly. These kinds of surveys are expensive and time-consuming.

- A drop-off survey is another means of gathering responses, the questionnaire is given to the targeted respondent.

This study uses the assessment type to gather possible solutions, practices, and guidelines. The source medium used to communicate with the particular respondents is e-mail service, and the responses are collected thoroughly using an online survey tool.

4.8.2 Steps for Conducting an Online Survey

Similar steps to conduct an online survey are used as in other methods like planning, data collection, data analysis, reporting, and application needs. The main aim of each general procedure has a few specific required tasks to be followed (Lois and Valerie, 2007).

- **Identify the evaluator:** The evaluators are the master students of their respective master thesis reports under the supervisor's guidance.

- **Identify and engage the stakeholder:** The stakeholders are mainly those interested in the program (thesis results). A particular survey process has been used in this study to identify these stakeholders from different companies and ask them to respond to the survey questions.

- **Determine resources:** The resource is mainly based on time spent by the respondents on the survey link, which is generated from a free or paid online survey tool. The particular results can also be analysed with the help of an online survey tool. This tool also generates a report, which summarises the specific responses for each question presented in the questionnaire.

- **Writing goals and objectives:** The survey aims to collect the expert opinion and experience based on the evaluation and adoption of secure CC services and security techniques identified under 'incompatibility.' Stated the objectives of performing surveys are evident at the beginning.

- **Evaluation of results:** The evaluation of study results in such a way that can help new or existing CC services users identifies alleviation strategies for the security services to decide about adoption or making changes respectively. For the researchers, this evaluation will help to identify areas that are beneficial in determining the adoption process of secure CC services.

- **Using software to implement surveys:** The survey link was created at (www.surveymonkey.com). The survey link is active to gather as many responses as possible that can suggest alleviation strategies. The survey link is also a one-time response link, assuring that there won't be multiple responses from the same person (this avoids duplication), which can improve the quality of surveys.

4.8.3 Designing the Survey Questionnaire

Five questions were constructed to check study results are helpful for the research (Lois and Valerie, 2007). These questions are as follows:

- What do we want to know?
- About whom do we want to know
- How do we word the questions?
- How do we elicit appropriate and adequate responses?
- How do we interpret the results?

The questions were designed to focus on the evaluation and guidelines for adopting secure and cost-effective CC services with no alleviation strategies identified from the particular literature. The questions in the surveys were framed based on the SLR. Therefore, a validated survey questionnaire was used from other CC adoption studies and modified to suitability for this study. In the first stage couple of Managerial level professionals working in CC environments were contacted to check the survey questionnaire. In this respect, four professionals consented to participate; all of them have minimum Post Graduate level qualifications and good experience in the cloud. Out of four, three have worked or worked

in multinational firms, and one has his own business and provides different services to small, medium, and large enterprises, including schools.

The questionnaire was also discussed at *the AWS User Group Birmingham, West Midlands*, meeting on Thursday, 8th February 2018. In the meeting, 36 people were registered. A request to discuss the survey questionnaire was sent to Host Mr. Chris K., and Mr. Chris K. and the co-Host granted permission to Mr. Martin R. On meeting day, 8 IT professionals participated in the discussion, and all were working in the cloud environment. Among those, three were managers; one was a director, two were cloud systems support engineers, one was a cloud software engineer, and one was a cloud cyber consultant.

(Hosted by: Chris K., 2018) 8 FEB
Past Meetup
AWS User Group Birmingham, West Midlands
Thursday, February 8, 2018
7:00 PM to 9:00 PM

Chris K.
Hosted by Chris K.
From AWS User Group West Midlands

Attendees (36)

Venue: Advanced
The Mailbox 101 Wharfside Street · Birmingham

Finally, a questionnaire was sent to supervisors for their suggestions and improvements. Then the final version of the questionnaire was sent to the ethical committee of University of Wolverhampton (UoW) for approval. The approved version was created through this procedure, which was used for surveys and interviews, and the same is presented in Appendix A. Survey link was made at (*the survey link at* www.surveymonkey.com*)* and

opened for a response. The respondents were contacted through e-mail and requested to fill out the surveys. As a follow-up strategy, the respondents were sent reminders at regular intervals. The plan was to get a minimum of 100 responses from particular respondents.

4.8.4 Running a Pilot test

A pilot study was conducted to check questionnaire reliability. This pilot study was planned on the first ten responses of an actual survey, and data analysis was performed to verify the proposed logic.

4.8.5 Survey Administration

The plan was to adopt the method of an electronic survey. For this purpose, the services of *survey monkey* were utilised and emails were sent to the targeted population, these contained a brief introduction to the survey. The plan was to keep the survey open as much as possible to obtain the desired number of required results. The survey started with the initial information about the respondent and the rest on Likert-type questions about the research.

4.9 Conclusions

This chapter outlined the research methodology and identified the range of the research approach and methods. The chapter aim was to develop an appropriate research methodology for solving the investigation problem: understanding the challenges confronting internationally SMEs, and large enterprises, and after that developing an adoption model.

The methodology is established on a positivist research philosophy. This was considered suitable since ICT revolution adoption is a developed research area and has been commonly explored. Furthermore, a substantial number of philosophies and models have been used and certified in studying several sorts of technological revolutions. For this purpose, several concepts can be adapted to CC adoption. Qualitative and quantitative studies (mixed method) were used. Based on these research methodologies, the next chapter focused on constructing the research model and the hypothesis.

Chapter 5 - Research Model and Hypotheses

5.1 Introduction

This chapter discussed the proposed research model and hypotheses. The first section of this chapter discusses the research model and its respective constructs and later explains which theory belongs to each construct. The second section explains each construct in detail and introduces a related hypothesis.

5.2 Research Model

A conceptual model is proposed to study enterprises' adoption of CC services. According to this model, eleven variables influence the decision of CC adoption. These eleven variables are (1) external support, (2) competitive pressure, (3) Senior Management support, (4) employee's cloud knowledge, (5) adequate resources, (6) information intensity, (7) relative advantage, (8) complexity, (9) compatibility, (10) security and privacy, (11) cost-effectiveness. All variables, except complexity, positively influence the adoption of secure CC services. Table 5.1 depicts the conceptual model proposed in this research.

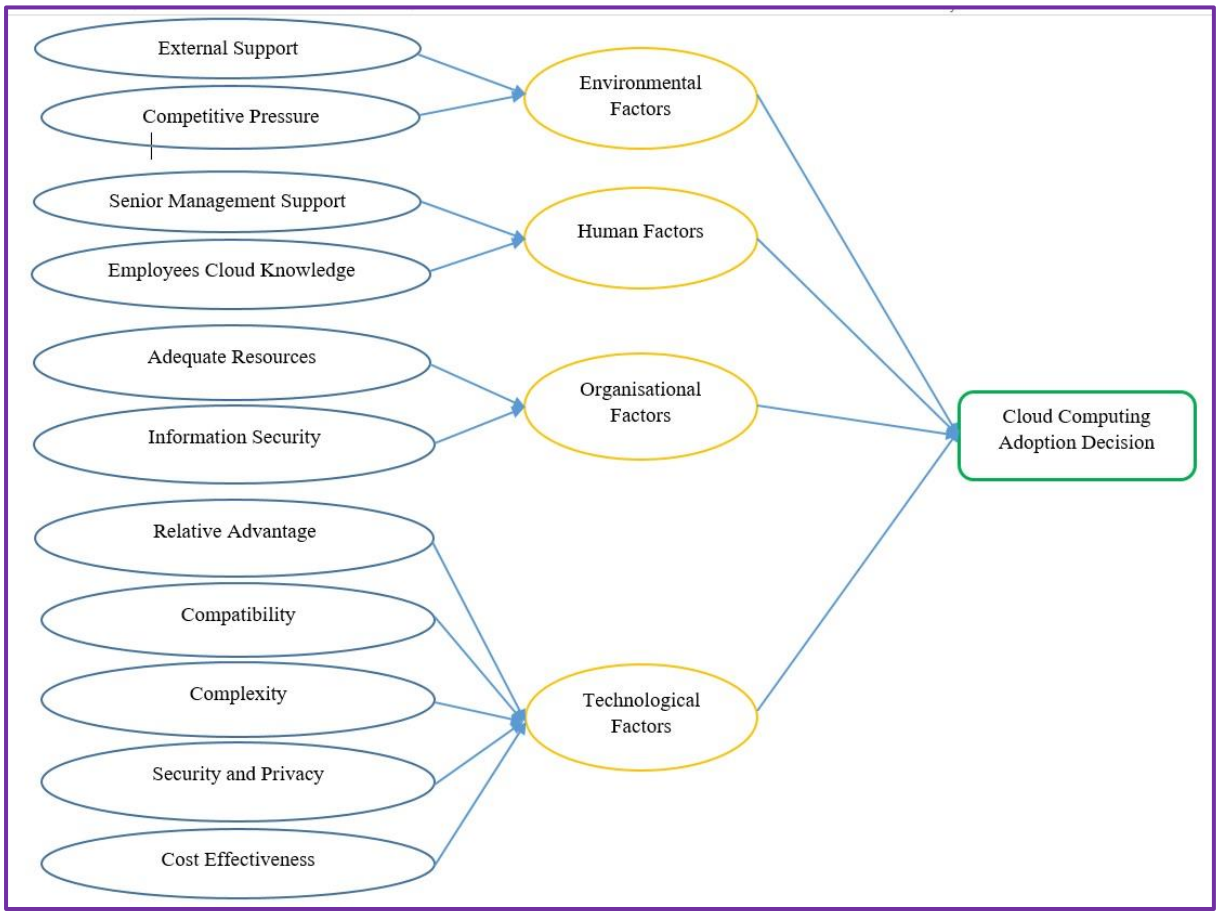

Figure 5.1: Conceptual Model

Eleven mentioned variables are grouped into four main categories. The four groups of factors categorised are environmental, human, organisational, and technological factors—these factors impact the decision of CC services adoption among enterprises. Environmental factors may influence the decision to the adoption of new technologies. Competitive pressure and external support are environmental factors in the proposed model.

Human factor is the second category of variables based on Senior Management support, employee knowledge has characteristics that considerably influence the decision to adopt an innovation. The features of the organisation that influence the adoption decision are known as organisational factors.

The organisational factors of CC comprise information intensity and adequate resources. In the research model, the Senior Management support and the employee's cloud knowledge are essential in adopting new technologies.

The final category of constructs in the proposed model is the technological factor. This group of variables mainly comprises relative advantage, complexity, compatibility, security & privacy, and cost-effectiveness. Some studies reveal that relative advantage, complexity, compatibility, and cost-effectiveness are characteristics of innovation that influence adopting an innovation most.

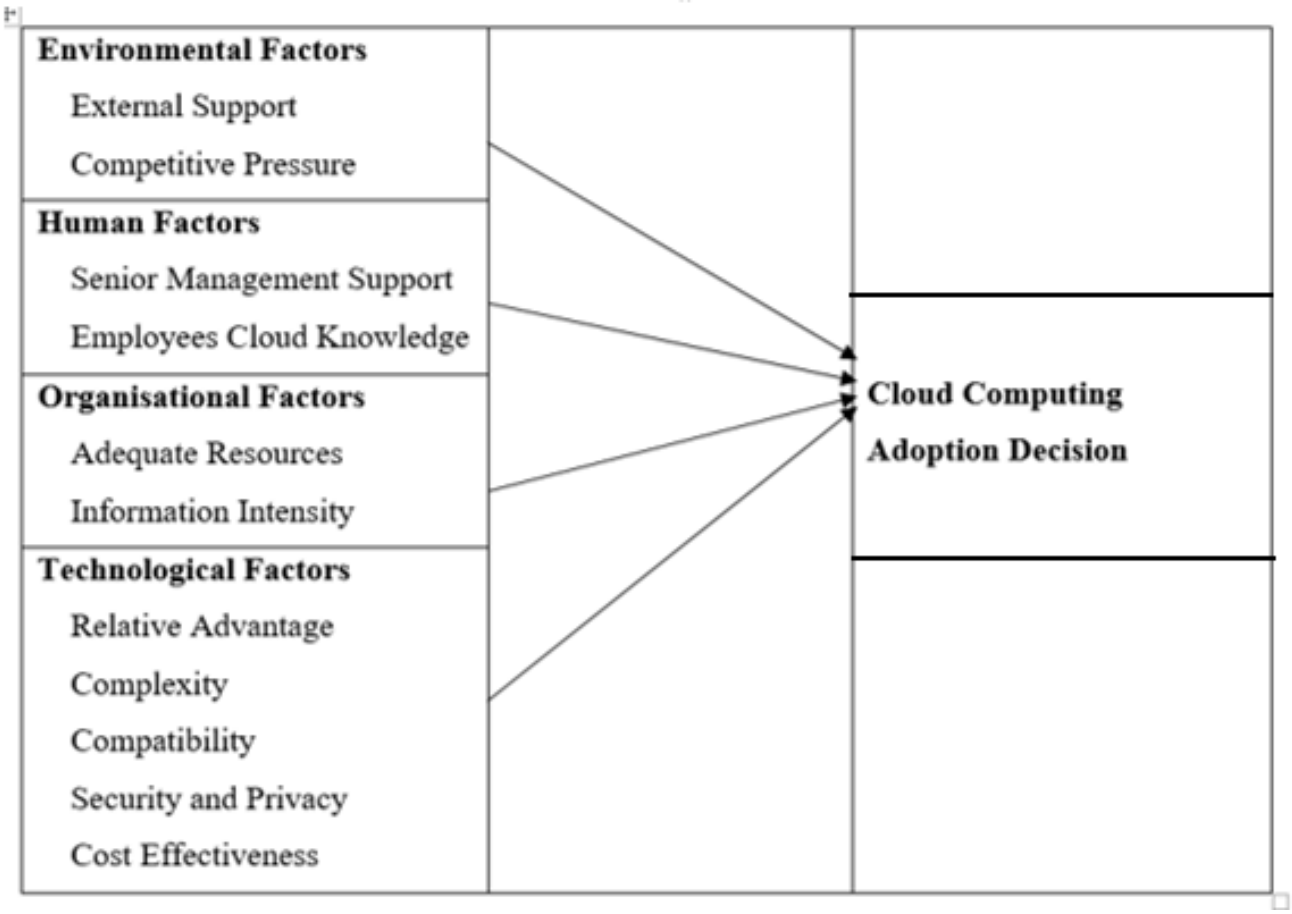

Figure 5.2: Research Model

Variable	***Definition of Variable***	***Effect on Decision***
External Support	The perceived importance of external support offered by cloud providers (Training, customer service and technical support).	Positive
Competitive Pressure	Competitive pressure is the level of competition among firms in the specific industry that the company operates in.	positive
Relative Advantage	The degree to which an innovation is perceived as being better than the idea it supersedes.	Positive
Complexity	The degree to which an innovation is perceived as relatively difficult to understand and use.	Negative
Compatibility	Companies expectations with respect to cloud services adoption to be compatible, easy-to-use and fairly comfortable soon after adoption.	Positive
Security and Privacy	Security & privacy in which CC is perceived as being more secure than other computing paradigms to perform business activities.	Positive
Cost Effectiveness	In which decision makers observe the total cost of CC utilisation lower than other computing paradigms.	Positive
Senior Management Support	This will convey the innovation importance for all stakeholders of organisation, and at the same time also ensure the timely availability of the necessary resources required.	Positive
Employees Cloud Knowledge	Employee's prior technology knowledge or experience of cloud to be important in technology adoption decisions.	Positive
Adequate resources	Adequate resources are also critical to the success of adoption. If the budget is sufficient, positive support will be provided by human resources.	Positive
Information Intensity	The degree to which information is present in the product or service of a business.	Positive
Adoption Decision	Companies' current status (adopted or not adopted CC).	Dependant Variable

Table 5.1 Variables definition and their effect on cloud adoption.

5.2.1 Cloud Computing Adoption Decision Making Framework.

There are three levels of decision-making, strategic, tactical, and operational, each of which treats a different aspect of the decision. All levels of decision-making are elaborate in the procedure of CC services adoption. The process is separated into three stages, as shown in Figure 5.3, the strategic level, which focuses on the decision of whether to move to CC or not; the tactical level, which focuses on the selection of the cloud deployment model; and the operational level which focuses on the choice of cloud service model and actual migration.

In the strategic decision-making stage, the decision is taken as to whether or not to migrate to the cloud. The framework employs a cloud adoption decision model constructed on the analytic hierarchy process (AHP) and case-based reasoning (CBR) approaches. The AHP component is used individually, but the benefit of the CBR component is that it helps to authenticate the decision and delivers information derived from previous cloud adoption decisions. Tactical decision-making is concerned with the choice of the CC deployment model. The model used in this phase also uses an integrated AHP and CBR approach—operational-level decision-making, which includes determining the service element and migration. Figure 5.3 represents the decision-making levels, the decision category for each decision, and the tools used to support each decision (Abdullah, 2016).

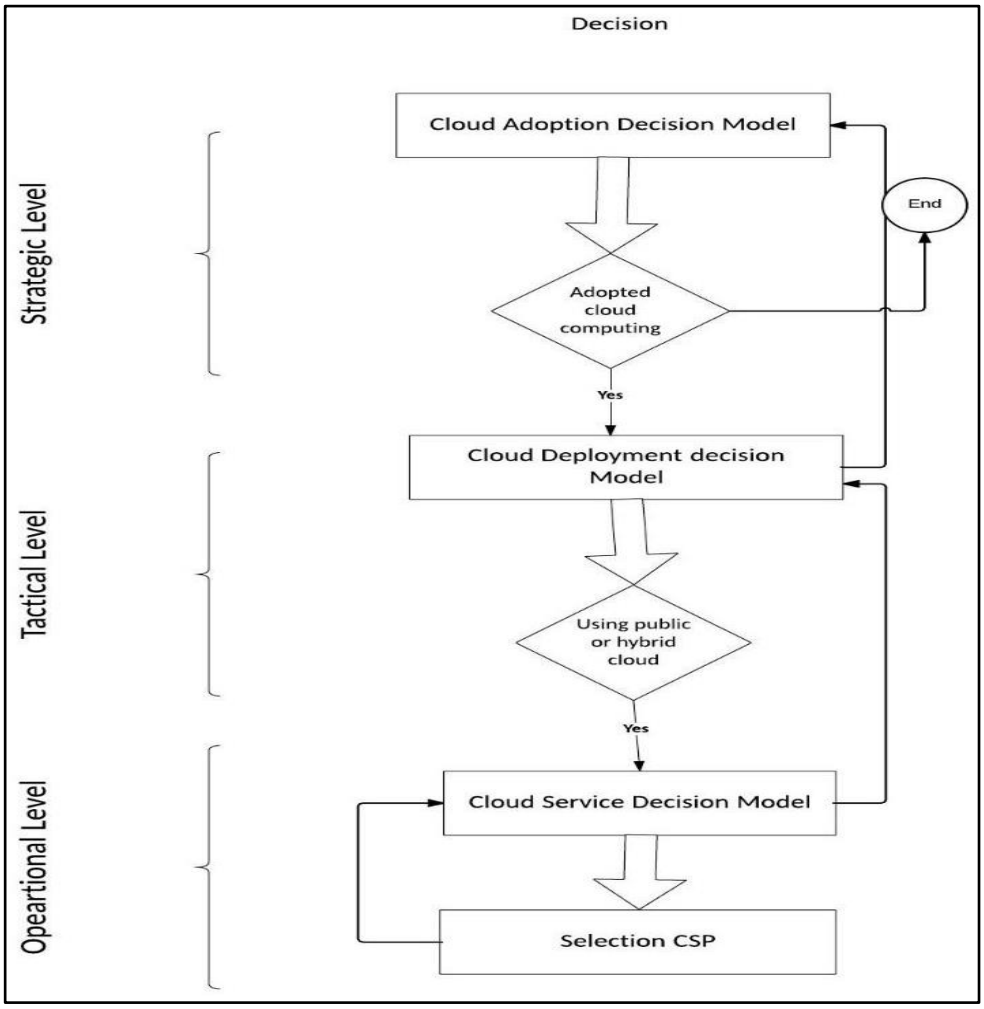

Figure 5.3: Flow Chart of Cloud Adoption Decision Model.

5.3 Research Hypothesis

The prime objective of this research is to analyse associations among different business factors and study the guidelines for secure CC adoption services relationships between them. And to consider the essential factors associations, such as environmental, human, organisational, and technological factors (Theo et al., 2018).

The environmental factor comprises External Support and Competitive Pressure. The human factor includes support and Employee cloud knowledge. The organisational factor contains information intensity and adequate resources. Finally, the technological factor comprises CC's Relative advantage, Complexity, Compatibility, Security and Privacy, and Cost-effectiveness with the companies' norms and technologies. These factors and their constructs have been studied by different researchers in administration, management, and the business community, but this study is in the aspect of evaluation and guidelines for the adoption of secure CC services.

This study analyses the association among the primary factors and their constructs and shows the overall performance impact of an organisation using secure CC services. The organisation's confidence increases help to reduce uncertainty and increase the potential for utilising secure CC services in organisations. To empirically investigate the research questions and factors based on their respective constructs, the following hypotheses related to the technological context and its key factors are proposed:

H1: The provision of *external support has a positive impact* on adoption of secure CC.

H2: The existence of *competitive pressure has a positive impact* on adoption of secure CC.

H3: *Senior Management support has a positive impact* on adoption of secure CC.

H4: *Employee knowledge about CC is positively related to the* adoption of secure CC.

H5: *Adequate resources are positively* related to the adoption of secure CC.

H6: *Information intensity is positively related to the* adoption of secure CC.

H7: *Relative advantage of using* CC *is positively related* to the adoption of secure CC.

H8: *The perceived level of complexity of the* CC *has a negative impact* on the adoption of secure CC.

H9: *Level of* CC *compatibility with companies' norms and technologies has a positive influence* on adoption of secure CC.

H10: *D*ata security and privacy *has a positive impact* on adoption of secure CC.

H11: Evaluating cost effectiveness *has a positive impact* on adoption of secure CC.

In this section of the research, each construct is explained in more detail. The related hypothesis for each construct is then presented.

5.3.1 External Support

The companies' size and structure do not allow them to have sufficient internal IS support. Therefore they should depend on external parties (Swathi et al., 2014). However, in this perspective, external support is defined as "The perceived importance of external support offered by cloud providers." The contents of external support in this research include training, customer service, and technical support provided by cloud providers (Dalsang and Sun, 2014). Though the best levels of external support provided by cloud providers increase the chance of cloud adoption by companies; therefore, the first hypothesis is:

H1: The provision of external support has a positive impact on adoption of secure CC.

5.3.2 Competitive Pressure

Competitive pressure refers to "the level of pressure felt by the firm from competitors within the industry" ((Ben, Delroy and Densil, 2013), p. 1341). Pauley et al. (2011) stated that competitive pressure is very influential in the adoption of technology. Competitive pressure is the level of competition among firms in the specific industry in which the company operates. It forces companies to be more innovative to stay in business. In contrast, it argued that there is no relation between competitive pressure and technology adoption. This study will therefore investigate whether organisations encounter pressure from competitors to influence CC services adoption or whether CC technology helps organisation gain a competitive edge to stay in the market.

Five different competitive forces are introduced, including new entrants, the bargaining power of customers, suppliers, substitute products and services, and rivalry among businesses in the market (Swathi et al., 2014). Only the last two of these five competitive forces are considered for this research. The most current computing paradigm is CC in the market (Pei-Fang et al., 2014) to achieve a competitive advantage. So, the following hypothesis is developed in the context of CC:

H2: The existence of competitive pressure has a positive impact on adoption of secure CC.

5.3.3 Senior Management Support:

Senior management support refers to the decision-makers who are also key to successfully integrating new technological innovation in organisations that influence innovation adoption (Theo et al., 2018). This will convey the innovation importance for all stakeholders of organisation, and at the same time, also ensure the timely availability of the necessary resources required (Haslinda and Mohd, 2017), (Arnab, Guo and Alok, 2013).

According to (Hemlata et al., 2014), Senior Management can encourage an enterprise to adopt innovation in two ways: by creating an organisational environment that supports change and innovation to develop the enterprise's core mission and vision, the leadership provided by Senior Management can support innovation by emphasising the importance of innovation to staff. Thus, the role of Senior Management leadership can deliver a vision and obligation to create a positive environment for innovation when the complexity and sophistication of technologies increases (Mark et al., 2018). Hence, the following hypothesis is developed in the context of CC:

H3: Senior Management support has a positive impact on adoption of secure CC.

5.3.4 Employees Cloud Knowledge

Employees' knowledge or experience of CC technology is not directly measured. The CC services adoption rate is directly interrelated to levels of skills and expertise in CC (Mohammed, 2018). Several studies discuss employee technical knowledge or experience to be influential in technology adoption decisions.

Previous similar technologies users' experience could play a vital role in the adoption decision. Users' similar experiences are recognition that can be viewed on a continuum, which represents the degree of a link between current practices and experience (Theo et al., 2018). Therefore, a company whose employees know innovation certainly has less resistance to adopting new technologies. Some empirical evidence demonstrates the positive relationship between employees' technology knowledge and experience when deciding to adopt (Swathi et al., 2014). In the context of CC, the following hypothesis has been developed:

H4: Employees' Knowledge about CC is positively related to the adoption of secure CC.

5.3.5 Adequate Resources

Adequate resources refer to the resources needed for CC services adoption (Theo et al., 2018). The previous studies reflect that organisations with the necessary resources are more likely to adopt CC services than those with inadequate resourcing levels (Jiunn-Woei, David and Yen-Ting, 2014). The CC adoption project requires Senior Management commitment, ample time, sufficient money, talented human resources, and technological competencies (Chiu et al., 2007), (Xiaolin and Ahmed, 2015). In this study, adequate resources provide confidence to the organisations to invest in CC.

H5: Adequate resources are positively related to the adoption of secure CC.

5.3.6 Information Intensity

Information intensity is defined as "the degree to which information is present in the product or service of a business" (Swathi et al., 2014). Different company sectors have different natures of information intensity; for example, financial brokers need to have access to the most current information. Therefore, in this study, information intensity means the companies' confidence in accessing up-to-date, reliable, accurate, and relevant information whenever required. According to study, companies whose business depends on information are more likely to adopt CC. The following hypothesis is related to this construct:

H6: Information intensity is positively related to the adoption of secure CC.

5.3.7 Relative Advantage

Relative advantage is defined as “the degree to which an innovation is perceived as being better than the idea it supersedes” (Everett, 2003), (Arnab, Guo and Alok, 2013). According to (Haslinda and Mohd, 2017) organisations recognise the significant importance of the relative advantages of CC services, such as reducing IT costs, creating a competitive advantage, and enabling more accessible access to information. In this research, the relative advantage is used as the degree to which decision-makers understand CC technology as being better than other computing paradigms. In previous studies, the relative advantage impact of technology on adoption has been broadly investigated.

CC services offer a variety of advantages related to capacity, reliability, flexibility, and instant access to hardware resources, and especially small businesses would be beneficiaries of faster time to market with no upfront huge capital investment. CC solutions can have several relative advantages, including load relieving of the network infrastructure, reduced hardware maintenance and infrastructure operation, simple administration, collaboration opportunities, potential cost savings, and increased automation (Karlis, Darya and Tatjana, 2018). Based on the reasons mentioned above, relative advantage has a positive influence on the adoption of CC services; therefore, in the context of CC, the below hypothesis is formulated:

H7: Relative advantage of using CC *is positively related to the adoption of* secure CC.

5.3.8 Complexity

Complexity refers to "the degree to which an innovation is perceived as relatively difficult to understand and use" (Everett, 2003), (Arnab, Guo and Alok, 2013), (Kamal et al., 2016). Therefore, a technology that is difficult to understand and its use is considered to be complex.

With the increasing adoption rate, new technology should be user-friendly and easy to use. Generally, sometime innovations require the adopter to develop new skills and understandings (Marry et al., 2018). In contrast to other innovation characteristics of CC services, the level of complexity of the system has a negative influence on the adoption of CC services:

H8: The perceived level of complexity of the CC *has a negative impact on* the adoption of secure CC.

5.3.9 Compatibility

Refers to compatibility constructs that significantly influence the adoption rate of innovations, "The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (Nouf et al., 2014), (Arnab, Guo and Alok, 2013), (Kamal et al., 2016). The companies' expectation for cloud services adoption is to be compatible, easy to use, and reasonably comfortable soon after adoption.

Compatibility concern about CC services is recognised as consistent with the existing values, experience, norms, and technical aspects of the work environment and the companies need (Omondi et al., 2015). Therefore, the CC's compatibility with the work environment positively impacts the adoption of secure CC; therefore, the related hypothesis is as follows:

H9: Level of CC *compatibility with companies' norms and technologies has a positive influence on* adoption of secure CC.

5.3.10 Security and Privacy

Refers to CC security and privacy in which CC services is perceived as more secure than other computing paradigms to perform business activities. The CSPs claim they can protect companies' valuable data more securely than the company itself. Whereas security is concerned with the security of any service, data centres, media, more considerably, the privacy and confidentiality of the companies' valuable data (Claude et al., 2017).

Security issues for different systems and their respective technologies apply to CC (Hassan, 2017). Although the maturity accomplished by the CC solutions and the security certifications attained by the main CSPs, security still stands as the main barrier to adopting CC services for critical applications and their sensitive data (Rajkumar and Sukhpal, 2018). Therefore, in contrast, higher levels of security and privacy have a positive influence on the adoption of a secure CC database; hence in the context of CC, the following hypothesis has been developed:

H10: Data security and privacy has positive impact on adoption of secure CC.

5.3.11 Cost Effectiveness

Reduction of total cost has been recognised as one of the main factors that encourage organisations to adopt CC. The traditional process often involves most organisations buying the required technical equipment and tools, hiring the consulting services, paying for installation and license, and signing up a maintenance contract for an extended period (Hassan, 2017).

Cost and time saving, increased efficiency, flexibility and scalability of resources, increased collaboration in innovation, quick recovery of data in case of emergency, better communication with a client are among the key advantages of CC (Karlis, Darya and Tatjana, 2018). The total cost includes fixed costs, including initial investment, variable cost is part of the maintenance and upgrade of the systems, especially the training cost. Therefore, the benefit of utilising low-cost service increases the likelihood of adoption of secure CC services (Theo et al., 2018); hence, the following hypothesis is developed in the context of CC:

H11: Evaluating cost effectiveness has a positive impact on adoption of secure CC.

5.4 Conclusions

This chapter has identified several significant factors and variables related to the CC services adoption of revolution characteristics, environmental, human, organisational, and technological factors. The factors and variables identified from the literature are substantial for CC services adoption in SMEs & large enterprises perspective. While several other factors and variables exist in the literature, the selected factors and variables are reflected to be more significant to small, medium, & large enterprises, based on the prior discussion in Chapter Two.

The chapter has accomplished its objective by developing the research model, which delivered a view of the significant elements in CC adoption. The model developed a multidimensional methodology and presented a framework for exploring the research topic. The investigation model was implemented per the guiding principle provided in Chapter 5 to accomplish the objectives of this study. The research model presented in this chapter used mixed methodology, i.e., qualitative and quantitative analysis. The chapter discussed the construction of hypotheses and their outcome based on the literature review of this study. The research model was further refined to explore the topic on a larger scale covering. The qualitative and quantitative research analysis is performed in chapters 6 & 7, respectively.

Chapter 6 - Qualitative Data Analysis

6.1 Introduction

CC can improve the competitiveness of organisations and influence economies. From a global perspective, organisations are utilising cloud computing technology (CCT) in their traditional day-to-day business activities. However, previous studies have not considered exploring the factors influencing CC adoption among organisations. To fill the research gap, this chapter explores the significant factors that affect the decision to adopt CC by organisations. The procedure adopted is that data has been collected from seventeen firm-level semi-structured interviews with IT professionals in different sectors and discussed.

The analysis procedure specifies that different factors are essential to make these decisions, for instance, external support, adequate resources, information intensity, relative advantage, security/privacy, and evaluating cost due to geo-restrictions. This study endorses the importance of competitive pressure, senior management support, and employee cloud knowledge, complexity, and compatibility, factors in the adoption of CC services among organisations.

In the first phase of this research, semi-structured interviews were used. Its purpose is to pilot the developed research model and survey questionnaire on a small sample of 17 organisations before testing the large-scale qualitative study. The primary objective of this chapter is to explore the relevant elements that affect the adoption of CC and use them in the 2nd phase of the survey study.

6.2 Semi-Structured Interviews.

The ability to gain an in-depth investigation of the quantitative study, qualitative data collection and analysis is done. In this research, semi-structured interviews were initially conducted to classify the factors that affect CC services adoption among SMEs and large organisations. The semi-structured interview is more open than the structured one, allowing for new concepts to be conveyed throughout the interview. Also, a semi-structured interview combines structured questions with an unstructured examination (Wilson, 2014). The semi-structured interview

leads attention to open questions concerning drivers and barriers of CC services adoption from various perceptions, e.g. environmental, human, organisational, and technological (Gregor, Marcus and Axel, 2018).

In this regard, 17 semi-structured interviews of professionals were conducted in different IT roles in the organisations. Investigators must avoid bias when conducting interviews by formulating and organising questions so that respondents entirely recognise them. Mark, (2009) suggested that open-ended objects can abolish prejudice. Furthermore, (Bernard, 2006) added that the questions must be brief, jargon, and complexity-free, evading theoretical perceptions. For this research, to avoid bias the following approaches are adopted:

1- Use of a semi-structured form of interviewing
2- An Open-ended, simple and limited number of questions (20)

6.3 Inclusion and Exclusion

As the essential investigation question of this research is to categorise factors affecting the adoption of CCT by organisations; it was crucial to form a sampling structure of professionals that could reply to the interview questions suitably.

Three principles were set for selecting professionals; firstly, the member should have a place in business sector organisations. Secondly, the member should be at a (middle to senior) managerial level in the organisation, and thirdly, the member should be aware of the CCT. These principles have been set because the data collected through the quantitative stage exposed that more than 90% of the members have a place in one or other business sector forms. Hence, the quantitative investigation reflected only the business sector's replies. Therefore, qualitative research must also gather data from the same sector.

The managerial level principles and CCT knowledge principles ensure that the member is a qualified and competent person aware of IT, especially CC technology. Therefore, this individual is capable of replying to the interview questions. For this research, a structure of twenty-five (25) members was established, and they were approached through emails to approve the interview. After the approval, handouts and other associated evidence were emailed for their review. Twenty-two (22) decided to proceed with the investigation. Three members were deleted from the list as they replied that they were not familiar with CCT, whereas two-members left the job when they were approached.

Finally, seventeen (17) interviews were conducted.

6.4 The Interviews

In this research, the semi-structured interviews were conducted by visiting or telephoning interviewees, for data gathering with an agreed protocol, (Senarathna, 2016) to follow.

The typical period of each interview was around one hour, and the response was documented in MS Word documents and later examined the documented minutes. The semi-structured interview approach saved time for the documentation of open-ended interview questions. The interviewees have been briefed on the interview and read the thorough procedure, which included introductions and clarification about the study theme and the interview procedure. Then interviewees were given a copy of the questionnaire and aided in line with Hofstede's cultural dimensions through email. The impression was to refresh their memory with the substantial material sent earlier.

6.5 The Interview Participants

The study participants were from 17 different .organisations, 15 from West Midlands, England, and two from Pakistan. 13 of them were from national, and four were from multinational organisations. The organisations were categorised based on their sizes and adoption. I used the adoption categorisation theory to frame the possibility and classification of this study. (Marry et al., 2018).

Qualitative data are valuable in attaining perceptive evidence in the preliminary phase before conducting large-scale and expensive quantitative studies. Kwon and Robert (1987) showed the significance of the semi-structured interview approach, flexibility in developing questions and discovering phenomena, and achieving thorough information from the respondents. This study underpins the improvement of the hypotheses and questionnaire.

To deal with pro-adoption bias (Marry et al., 2018), this study placed emphasis on both adopters and non-adopters of CC services. In adopter categorisations (Marry et al., 2018), seventeen interviewees' feedback has been categorised into five leading groups, created on the range to which an organisation adopted CC comparatively earlier than others.

Table 6-1 reflects overall evidence about the organisations and their adoption phases. In the first group (P1-P4), four service providers, who contributed to the study, provided different computing services besides CC services. The second group (P5-P12) comprises those organisations which have already adopted some CC services. The organisations in the third group (P13-P14) are in the process of implementing the CC services. At the same time, the fourth group (P15) includes an organisation that intends to adopt in the next 3 Years. Finally, the last group (P16-P17) consists of organisations unwilling to accept any technology, i.e., do not intend to adopt any CC services. They believe that CC services are of no use to them.

Parti.*	Industry	Adoption Stage	Interviewees Occupation	Cloud Exp.* (Years)	Job Exp.* (Years)	Org.* Size
P1	Legal and professional services.	Provider	Client Support Manager	7	19	20-100
P2	Legal and professional services.	Provider	IT Support Manager	3	9	20-100
P3	Legal and professional services	Provider	Manager Implementation	6	13	20-100
P4	Legal and professional services	Provider	System Solution Manager	5	17	20-100
P5	Agriculture & Food Industries	Adopted	IT Manager	6	11	Above 1000
P6	Education	Adopted	IT Manager	8	16	20-100
P7	Healthcare	Adopted	IT Manager	5	11	20-100
P8	Manufacturing	Adopted	Oracle DBA	4	10	100-1000
P9	Media & Publishing	Adopted	Software Engineer	6	14	100-1000
P10	Legal and professional services.	Adopted	System Solution Manager	8	17	100-1000
P11	Healthcare	Adopted	System Analyst	4	9	100-1000
P12	Healthcare	Adopted	System Support Manager	5	17	100-1000
P13	Construction.	Process of implementing	IT Consultant	4	11	100-1000
P14	Education	Process of implementing	IT Manager	5	15	20-100
P15	Telecommunication & Technology	Intend to adopt in the next 3 Years	Client Support Engineer	5	12	20-100
P16	Media & Publishing	Do not intend to adopt	System Analyst	7	15	20-100
P17	Agriculture & Food Industries	Do not intend to adopt	IT Coordinator	4	8	Less than 20

*Exp= Experience, Org=Organisation

Table 6.1: Interview Participants Overview

6.6 Findings & Discussions

This study shows that CC services adoption by factors from different extents, including environmental, human, organisational, and technological factors and their respective variables, external support, competitive pressure, senior management support, employee cloud knowledge, adequate resources, information intensity, relative advantage, complexity, compatibility, security/privacy, and cost-effectiveness. Among the four primary factors and eleven suggested variables in the conceptual model, the study establishes evidence for the importance of nine of them. The remaining two, i.e., complexity and competitive pressure, needed to be found to have substantial influential effects on the adoption.

6.6.1 Environmental Factor.

This factor relates to CC as an environmental impact; its two variables are discussed below.

6.6.1.1 External Support

The previous research (Abdullah, 2016), (Shima, 2014) established the availability of external support resources is positively associated with adoption. While the majority of the participants' emphasise that external support plays a significant role in the adoption of CC services. The respondents who have already adopted, such as (P5, P6, P9, P11, and P12), emphasised the importance of moving some of their computing processes to the cloud and also outsourcing its complete or partial management and maintenance, which was the right decision and investment for them. External support to in-house computing for CC services helps companies to concentrate on their core businesses. It reduces the cost of having in-house IT resources and the related management and maintenance necessities for these resources (P7).

In the implementation process, some adopters showed concerns about having external support for using CC services. Adopter (P8) and in the process of implementing (P13) determined that appropriate staff training is essential to moving services to the CC environment, saving cost, and building in-house capability to stay safe in the future. While (P2), who provides storage and other cloud services, was neutral with external support variables.

6.6.1.2 Competitive Pressure

Conflicting with other ICT revolution adoption studies, competitive pressure did not affect organisation's adoption decisions (Boumediene and Peter, 2007). Several participants (P1, P3, P5, P9, P10, P12, P14, and P15) did not reflect this as a substantial factor. Decision-makers do not attribute too much importance to this variable while making CC services adoption decisions. Therefore, the qualitative study is not focusing on this variable.

6.6.2 Human Factors.

This factor is related to CC as a human impact; its two variables are discussed below.

6.6.2.1 Senior Management Support.

Concerning senior management support and their commitment, outcomes are steady with those of (Jungwoo, 2004), who found that without senior management support, organisations are comparatively less prospective to adopt innovative technologies. The service providers (P1, P2, and P3) have pointed out that in some cases, the chief executive officer / managing director picked up about the CC services and engaged IT, staff, to explore it further. On the other hand, adopters in process of implementing and prospectors (P7, P8, P10, P12, and P14) added that mostly it is the IT department that suggested the adoption of CC services, which was then supported by the senior management.

6.6.2.2 Employees Cloud Knowledge

Almost all participants agreed with this variable. The adopter (P6) has particularly mentioned that this variable was dominant to a certain extent. Whereas, some adopters from the Agriculture & Food Industries, manufacturer, and healthcare sectors (P5, P8, and P11) did not agree with the significance of this variable, as they believe in rapid innovations in their field and they have the latest manufacturing technologies and equipment. (P9 and P12) believe that employees in the firm's IT department should have good levels of IT experience and CC services awareness.

This exceptional factor could be the reason why they supposed CC technology innovation was not an important factor for them in the adoption decision. But, all the rest of the participants, whether they were service providers, adopters, in process of implementing, intend to adopt in the next 3 years, or do not intend to adopt (P1, P2, P3, P4, P6, P7, P10, P13, P14, P15, P16, and P17) are agreed with the importance of the employees cloud knowledge variable in the adoption of CC services solutions.

6.6.3 Organisational Factors.

This factor is related with CC as an organisational impact; its two variables are discussed below.

6.6.3.1 Adequate Resources

All the firms that have adopted CC services (P5 - P12) had believed this variable was of great importance. For instance, high speed (P10), reliable internet for CC services (P8) and adequate budget for CC services (P7) were the points that must be addressed while making a CC services decision. Delivery and reliability of the CC services could be ensured by providing the right resources. So, these resources must be placed to achieve the best results from technology. (P1, P3, P5 and P11). (P9 and P13) emphasised the budget element for the CC services, as these are cost-effective, but organisations have to spend some resources. Whereas, all the rest of the participants, whether they were adopters or in process of implementing (P6, P7, P8, P10, P12, and P14) have agreed with a relative importance of adequate resources variable in the adoption of the CC services solution.

6.6.3.2 Information Intensity

Most interviewees (P5-P14) were of the understanding that information intensity is a very crucial variable that may affect the objective of CC services adoption. The adapters, in process of implementation and intend to adopt in the next 3 years (P5, P8, P10, P13, and P15) agreed that adopting technology is a matter based on the information access, relevant, reliable, accurate, up-to-date whenever and wherever organisations need for business purposes.

Adopters in the process of implementing (P6 and P14) showed concerns that CC services help management teams in decision-making to provide relevant, accurate, reliable, and up-to-date information all the time. The provider (P3) stays neutral with all the time availability. Whereas, the majority of the interviewees either adopters or in process of implementing (P7, P9, P11, P12, and P14) have agreed to the comparative importance of the information intensity variable in the adoption of CC services solution.

6.6.4. Technological Factors.

This factor is related to CC as a technological impact; its five variables are discussed below:

6.6.4.1 Relative Advantage:

While firms recognise a specific revolution proposing a relative advantage, then it is more likely that they will adopt that invention (Anabel, Elias and Ranald, 2015). To achieve the best results, organisations should have a clear understanding of the relative advantages of cloud services. Therefore, for active and operational implementation of CC services, providers, and adopters, in process of implementing and intend to adopt in the next 3 years (P1, P4, P6, P9, P13, and P15) should validate and acknowledge the relative advantages of CC services. (P3, P10, (P3, P12, and P14) have agreed that users must have a perfect awareness and understanding of the advantages of CC services, so that process of adoption is more likely to be successful.

Furthermore, organisations already adopted services (P5, P8, and P11) are completely aware of the CC services benefits. Whereas organisations in the process of implementing, clarified their interest in CC services and expectation that this technology will make them more successful and proficient. CC service's scalability and flexibility could deliver them additional control over their processes (P7 and P13) and IT spending (P14). While interviewees (P16 and P17) have chosen not to adopt CC services, for the reason that the ultimate benefits of having CC systems are not clear to them, and their present infrastructure is suitable to cater to their business operation needs.

6.6.4.2 Complexity

Some interviewees agreed that perfect awareness and understanding of the advantages of CC complexity skills required to adopt CC services, difficulties in transferring from current systems to the CC environment, and further effort needed in maintaining the CC platform is very much essential. It was not found significant with intention nor with the adoption of CCT.

This indicates that organisations recognise (P6, P7, P11, and P14) that there are no complexities in adopting CC services; learning skills needed to adopt CC services, transferring current systems to the cloud, and maintaining cloud platforms. Complexity is constantly found as an inhibitor in technology adoption studies (Jordi et al., 2007), where some organisations are found to have hesitations regarding the use of advanced technologies, particularly that of CC services.

Adopters (P6, P9, and P12) stated that trust and proper planning are required when adopting CC services.

Therefore, the complexity of CC services was not found to be a concern in the adoption of CC services. For example, the adopter (P9) describes that *"*It's really easy these days. Most of the CSPs have trials*"*. The primary advantage for organisations is that they can have a choice of the services that they are most comfortable with and pay on a monthly or pay-as-you-go basis and withdraw facility available whenever they want (P5). A CSP (P3) believes that their service packs are standard, and the service agreement is subject to the granularity and the level of essential service required.

6.6.4.3 Compatibility

The mainstream of the interviewees, either providers or adopters, in process of implementing, intend to adopt in the next 3 years, and even those who do not intend to adopt (P1, P3, P5, P6, P7, P9, P12, P14, and P15) agreed on the significance of the compatibility variable of the in-house system within the CC environment in the adoption of CC services. For instance, an adopter (P5) explained that everything was steady and normal with them when they transferred to the CC and further elaborated that: "almost same software tools are using in-house as you are using in the cloud such as Microsoft Office, emails, etc. You did not have to change much, and it still has more features for the price paying*"*.

A service provider & an IT professional services company (P2) specified that as the technologies developed, compatibilities come to be of less concern. Some providers (P1 and P4) supposed that compatibility was quite a significant concern when considering CC services and they describe *"*If organisations use Microsoft in-house and they go to Microsoft cloud, so it's pretty easy, no downtime, nothing is changed, all as is per normal, no learning or additional training is essential.

But if they are changing platforms, for example if they use Microsoft in-house and all of a sudden they go to Google Cloud or Google Apps, Google Calendar, etc., there is substantial downtime, lots of learning and training are needed for some organisations. An experience in this respect a few times from different platforms and go to different platforms. Need prior planning and work for the customer.

Some interviewee's considered compatibility as non-relevant or immaterial to them for these reasons:

a **Type of service:** Interviewee (P11) uses cloud storage and there was no compatibility concern within their other system in this respect.

b **Type of applications:** Interviewee (P8)'s applications were in the cloud; they did not have any in-house system.

c **Hardware:** Interviewee (P10) said that all their infrastructure was CC-sourced.

It is understandable in these cases that there are no compatibility concerns, as there is no relation essential to be established between in-house systems and CC when deciding to transfer to the CC services environment.

6.6.4.4 Security and Privacy

Security and privacy were found to be a concern with a mainstream of the interviewees, even at their different adoption stages (adopters: (P5, P7, P8, P11, P12); in process of implementing prospectors: (P13, P14); service providers: (P1, P2, P3, P4) and even who do intend to adopt (P15, P16). Many emphasised that security and privacy were one of the main significant variables in the organisational decision to adopt CC services (P6). An adopter of CC services from an IT industry (P10) specified that security and privacy were one of their central concerns due to their operation and the sensitivity of their valuable data, as they deliver Customer Relationship Management (CRM) applications for contract services over the CC to their clients.

Another adopter of CC services (P9) specified that security and privacy were an issue for their business, and they had their extra in-house backup of databases in event of an emergency, and in the event of a break of services received from the CSP under any situations. Their added security extent of backup through their system “Source Anywhere”, allowed them to safeguard their valued customer database and their organisational data. In case of any emergency, they could export their data anywhere they wanted. The same interviewee also elaborated and described that "In their opinion, it is extra protected with regards to security and privacy also maintained in the cloud than in office because cloud delivers safe data centres, they backup, they encrypt it, I do not fear about fires, theft, everything like that. It is greatly safer in the cloud than it is in your own office”.

Some CSPs (P2, P4) agreed that security and privacy are even more important than the cost of CC services, and he further elaborated that the lack of control in this respect within global CC is the motive behind the slow adoption of the CC services. As in process of implementing (P14) had a related belief, considering that both of these variables (i.e., security and privacy concerns and cost) are central points to either adopting or not adopting CC services.

Security and privacy compassion were found to depend on the nature of the business and the compassion for the valuable data (service providers: P1, P2; adopter: P6; do not intend to adopt: P16, P17). For example, a CSP (P1) stated that their clients from Healthcare were more sensitive to security and privacy rather than others who were in a different sector, such as construction, real estate, etc. One who does not intend to adopt (P16) explained that ″Our business mainly considers high data security and privacy regarding the adults, children and child protection and that somewhat essentials to be carefully measured″.

Security and privacy were found to be an issue when considering the in-house feasibility structures of control and administration over an organisation's data and infrastructure. When services are explicitly transferred to the cloud, control and administration become less visible and less likely in many respects, particularly in the end to end basis.

Even though it was found that some of the adopters reflected CC based on its benefits and advantages as their main priority. Whereas security and privacy was an issue with them, it was not highly prioritised in their decision-making practice (P9, P10) or they took extra in-house safety measures to keep themselves in a comfort zone (P5).

6.6.4.5 Evaluating Cost

Cost evaluation was found to be one of the crucial concerns for organisations in the adoption of CC services (Service Providers: P2, P4; Adopters: P7, P10, P12; in process of implementing: P13, P14). CC services can free firms from the administration and maintenance of in-house computing resources to concentrate more on their primary businesses and influence their competitiveness; however, these facilities derive at a cost. The cost of facilities is one of the significant contributing variables to the adoption of CC services (Service Providers: P1, P3). In establishing a cost-benefit analysis, organisations should focus on whether there is more benefit than the cost of CC services (in the process of implementing: P14).

6.6.5 Cloud Computing Adoption

The final, crucial, primary factor of this study is CC adoption. Many organisations i.e. adopters, in the process of implementing and intending to adopt in the next 3 years agreed to certain extents of CC services adoption. Organisations feel comfortable using the CC services, especially SMEs which benefitted from advanced technology and less hassle of administration and maintenance stated providers (P1, P2, P3, P4). Adopter (P8) stated that organisations have improved their performance with customers and suppliers in building business relations and confidence.

Adopters in the process of implementing (P5, P8, P9, P12, and P14) stated that reliable and secure computing facilities, as compared to traditional computing, motivate the employees and improve their efficiency. Organisations had more time to focus on primary business rather than to concentrate on IT operations and also have the opportunity to use the latest software tools at less price.

Adopters (P7, P10, and P11) stated that access to types of services from anywhere across different platforms helps to gain more professional expertise and develops potential skills. The main opportunity is to increase the ability of the organisation to adapt rapidly and cost-effective solutions for their business environment.

Those who do intend to adopt interviewees (P16 and P17) showed concern about confidence and are not convinced to switch from traditional computing to CC services. Overall, the impact of utilising the CC services to the sectors and different levels of services has been appreciated by the organisations, therefore adopters, in process of implementing and intending to adopt in the next 3 years have confidence in using the CC services and concentrating on their primary business. CC adoption facilitates helps organisations to achieve their business goals and objectives, it enables them to use different types of advanced services, and compete with their competitors by using advanced and up-to-date technologies.

6.7 Discussion

Table 6.2 outcomes summarise based on the evidence gathered, whereas in the rest of this section the effects are discussed of our outcomes concerning the four factors.

Factor	Support	Evident in Firm
Environmental Factor		
External Support	Supported	2, 5-9, 11-12, 13 (9 evident)
Competitive pressure	Not Supported	1, 3, 5. 9-10, 12, 14-15 (8 evident)
Human Factor		
Senior Management Support	Supported	1-3, 7-8, 10, 12, 14 (8 evident)
Employees Cloud Knowledge	Supported	1-17 (17 evidence)
Organisational Factor		
Adequate Resources	Supported	1,3, 5-14 (12 evidence)
Information Intensity	Supported	3, 5-15 (12 evidence)
Technological Factor		
Relative Advantage	Supported	1, 3-17 (16 evidence)
Complexity	Supported	1, 3-7, 9-15 (13 evidence)
Compatibility	Supported	1-12, 14-15 (14 evidence)
Security and Privacy	Supported - New	1-17 (17 evidence)
Evaluating Cost	Supported - New	1-4, 7, 10, 12-14 (9 evidence)

Table 6.2: Outcomes summary

Factors	Number of Variables
Environmental Factor\ External support	9
Environmental Factor\ Competitive pressure	8
Human Factor\ Senior Management Support	8
Human Factor\ Employees Cloud Knowledge	17
Organisational Factor\Adequate Resources	12
Organisational Factor\Information Intensity	12
Technological Factor\Relative Advantage	16
Technological Factor\Complexity	13
Technological Factor\ Compatibility	14
Technological Factor\Security and Privacy	17
Technological Factor\Evaluating Cost	9

Table 6-3 Factors VS respective variables

6.7.1 Environmental Factor:

For this perspective, two variables were discussed with the interviewees (see Table 6.3). However, there was no arguing restriction for the interviewees about these variables; they were allowed to share their relevant experience, knowledge, and professional skills on any other variables they might consider that could impact their decision. Though highlighted, no new variables arose as an outcome of the interview other than these two.

Unexpectedly, this study establishes that competitive pressure was not an important variable for most organisations for adoption. As explained previously, this may be associated with the low rate of transmission of CC among organisations. CSPs could inspire organisations, and especially SME businesses, in various ways. Such as, they can offer them to test the required software tool or service before adopting it, an opportunity for their customers to decide the level of compatibility and complexity of the software tool or service. As a result, this could help the organisation to authorise their choice and, therefore, moderate the alleged risks.

Supposing that competitive pressure can be an essential variable for adoption, service providers may need to validate the importance of adopting CC using significant successful case studies.

Therefore, this may relate to competitive pressure and the observability required for circulation. It is essential to perceive that an SME business's chief executive officer (CEO) is usually the owner-manager (Premkumar and Margaret, 1999). In such circumstances, IT staff and senior management direct sales. The simple reason is that support and assurance from the senior management team gave the company more prospective to adopt new technologies and avoid the situation where IT managers get the impression that CC influences their position. At the same time, external support was also a significant variable in the adoption decision.

However, the importance of adopting new technologies and respective external support, whether introducing the organisational revolution approach, had an excessive influence on the willingness to adopt new technologies. The external support may also influence, and in many circumstances even determine, the amount of IT infrastructure needed. The approach will highlight CC's importance for different sectors but not others. Therefore, CSPs need to recognise their client's industries and businesses first.

There are additional studies on ICT adoption by organisations in SMEs and large, which are regarding the outcomes of this study (Sohel and Roger, 2009), (Boumediene, Peter and Oswaldo, 2009), (Hsiu-Fen and Szu-Mei, 2008). However, this finding conflicts with outcomes by other researchers (Ben, Delroy and Densil, 2013). The irrelevance of competitive pressure in this study was not surprising, and it assumed the low adoption and awareness of CC services among organisations globally.

6.7.1.1 Human Factor:

Two variables in human factor recognised in this study are positively associated with cloud-based service solution adoption. The two variables are senior management support and employees' cloud knowledge.

Typically senior management support is found to be significant. The involvement of senior executives in evaluating the requirement of CC is critical for the firm. Studying consultants' proposals on CC services solutions and observing the adoption projects are crucial responsibilities that involve the support of senior decision-makers. These elements have been assessed in this study. This variable is one of the familiar aspects of the concept and has significant importance while adopting any new technology. This variable is one of the familiar aspects of the concept and has significant importance while adopting any new technology. This result is dependable on the outcomes of (Hui, 2010), (Plomp, Batenburg and Hertog, 2014) regarding the assessment of this factor in showing adequate resources for the adoption of revolution, upgradation, and transformation procedure.

The second variable is relatively less critical in adopting CC services decisions. Senior management retains their potential and trustworthy employees and prefers to be trained and create complete employee awareness to build their confidence. While some SMEs showed that they are concerned about the cost incurred to train the staff.

Employees' prior knowledge, IT experience of related technologies, explicit awareness, and senior management support with CC services are drivers in accepting the CC services. This outcome is earlier studied in ICT revolution adoption (Scott and Elizabeth, 2005), (Nabeel, 2005), (Ming-Ju and Woan-Yuh, 2008), (Ramdani, 2008). Therefore, this study established that all these variables were positively associated with the possibility of CC services adoption. These outcomes are consistent with the results concerning firm size (Sigi and Kenneth, 2000); senior management support (Plomp, Batenburg and Hertog, 2014) and discussing IT knowledge (Scott and Elizabeth, 2005).

6.7.2 Organisational Factor:

This study investigated the adoption of CC services from different business sectors. The investigator interviewed organisations from IT services, health, IT business professional services, manufacturing, education, retail, legal construction associates, and finance. This study detected that UK SMEs coupled into four groupings established based on their approaches to CC services adoption: adopter, in the process of implementing, intend to adopt in the next three years, and do not intend to adopt. This grouping methodology was suitable, and it delivered a broad glimpse, and eventually an inclusive illustration, of the diverse participants in the CC paradigm.

The two variables used in the investigation model are adequate resources and information intensity. This research established that all these variables are positively associated with the possibility of adopting CC services, and both variables are positively related to each other. The resources and intensity of information play a vital role in CC services adoption—ease of business activities with minimal resource utilisation, especially for SMEs. The latest technologies require adequate resources and provide maximum security for access to information whenever and wherever needed.

The CSPs provide pay-as-you and open contracts to use the services, accuracy, security, and update the information when required for decision-making purposes. Consumers with a similar level of service increased, or divergence of competencies with alternative services. Organisation size is the main feature constantly connected with the CC services adoption of technology. This factor has applied similarly to large, medium, and small businesses (Tiago and Maria, 2010). In small and start-up businesses, less investment and the latest use of technology inspire them and increase their readiness to accept the adoption of CC services. Large organisations scenario is different; SMEs are more flexible. The current outcomes could be more consistent with low, which establishes that large firms are a different perspective on adopting CC services.

6.7.3 Technological Factor:

This study investigated five technological variables: relative advantage, complexity, compatibility, security/privacy, and cost evaluation. A technological context comprises the widest variety of variables associated with the other three. The primary element of that study is assessing the adoption of technology and the mainstream of the dominant variables from the technology itself. Though, the numbers of perceived variables are more significant in this context.

Therefore, the latest anticipated technologies to transform substantial assistance and significance to an organisation, more than those prior-adopted technologies. So, the relative advantage is frequently used as a significant pointer in the ICT revolution literature (Ramdani, 2008), (Hsiu-Fen and Gwo-Guang, 2005). The client's innovation and self-enthusiasm are not all the time sufficient.

Awareness and understanding of these benefits are vital for adopting—consideration to the dominant position of the supplier marketing strategy. While in most scenarios in this study, initial adopters and the implementation process were likely to rely on confidence in the service providers, any element of uncertainty was quite a severe hindering variable for adoption. Cloud security/privacy, cost, and giving rights are the central elements for businesses.

A likely justification for this is that organisations, especially SMEs, are concerned about their potentially valuable data stored in the UK or, worse scenario: trusted geographical location, ensuring that cloud data centres adhere to UK laws and legislation or international laws and legislations. A significant impact arising from this is that CSPs need to focus on the location of their data centres sensibly. Taking neighbourhood and provisional trial elements into primary consideration may be the prime step to cutting down the level of uncertainty and the software or tools usage concerns of organisations, especially SMEs.

The CC services adoption trend improved if CSPs can provide and maintain their agreed level of service to their customers. The progress can be attained in three ways:

1. Refining the performance of the technology regarding security/ privacy and cost aspects.
2. Possibilities of trusted local data centres.
3. Refining the compatibility of the accessible facilities with in-house applications and environment.

A substantial promotion effort is essential from the CSPs to increase the suitability of CC services from the SME perspective. The organisations' innovation and capability in ICT only need to be more adequate elements to encourage them to adopt CC services. CC is a diverse technology with diverse structures and challenges.

6.8 Research Observations of Adoption of Cloud Computing

The ICT innovation adoption field has been broadly explored; the investigation also focused on different categories of technologies and contexts. Context is one of the crucial components in the revolutionary adoption of research. A contextual concern in revolution research approaches in diverse forms such as environmental factors, human factors, organisational factors, and technological factors e.g. (Pan and Jang, 2008), (Yehuda, 1999) specified that revolution adoption research reflects technological context to be a challenging field because several interrelated variables can have the prospective to inspire the decision concerning the adoption of new technologies. Some variables were drivers concerning, and others were obstacles in contrast to the adoption of technologies.

This research shows the adoption of CC services is resolved by environmental, human, organisational, and technological factors. Among the initial 11 variables projected in the study model, the research confirms the importance of 9 of them. Two of the variables, complexity, and competitive pressure, did not prove to have a significant influence on the adoption.

The interviewees headed to additional substantial perceptions relating to many large organisations, especially SMEs across England. These perceptions were about two new variables: evaluating cost and security/privacy due to geo-restrictions, which extended to the study model for additional investigation in the survey study.

The perceptions from this research led to the grouping of security/privacy and cost concerns due to geo-restrictions under one context. This context was named security and privacy risk variable and impact of the cost, as described previously. In chapter 7 the study model will be improved on a large scale by quantitative study, and the research will investigate the effect of two variables. The coming chapter will clarify details about the improved study approach to security/privacy and evaluating cost variables context.

6.9 Conclusions of the Qualitative Study

The primary investigation model of this study was security/privacy and evaluating the cost of the adoption of CC services. It is the first inclusive effort to investigate the variables of CC services adoption. Chapter 7 will clarify research objectives to improve a developed CC adoption model and recognise the factors and variables supporting CC adoption through survey research.

The significant features of the qualitative study established the factors: external support, senior management support, employee cloud knowledge, adequate resources, information intensity, relative advantage, compatibility, security/privacy, and evaluating cost. In addition, the research did not endorse sufficient reassuring perceptions from the interviewees about the importance of the complexity and especially competitive pressure variables on adopting CC services.

The outcomes of this research have vital implications for the academic sector, professional services providers, and the organisation's decision-makers. Professional Service providers can effectively articulate their facilities established on the outcomes of this research. For instance, they can reflect proposing organisations prefer to possess their data stored in the data centres within the country. This approach can exclude some of the organisation's issues regarding security and privacy by avoiding the reservations related to storing data in diverse influence structures.

The facility of local data centres is vital, and it can be central to the growth in the direction of the adoption of CC services and also to grow the productivity of the CSPs. Local data centres are necessary and can have related advantages for businesses and CSPs. Furthermore, CSPs can reflect generating additional awareness about their vital productive services, offer improved technical support, and deliver enhanced services contracts.

Adequate resources were an issue for some organisations. However, the perceptions from the interview indicate that mainstream CSPs need to articulate their marketing, communication, support, and understanding of the requirements of their clients and simplify what they have, what type of services they offer, and what level of adequate support they can deliver. This primary outcome delivers perceptions for organisation decision-makers by providing them with an additional practical, productive context to reflect on when to adopt CC services. The effects of the research are similarly beneficial for the research community as it augments the increasing literature on CC adoption.

Chapter 7 - Quantitative Data Analysis

7.1 Introduction

The attractive advantages of CC for cost-effectiveness, and its apparent benefits to businesses, concentrate on their primary business activities and their external support for IT resources to the cloud. CC services adoption has different issues that are outside the expertise itself. There is similarly a substantial investigation gap in exploring the adoption of this revolution in organisations.

This chapter relates a quantitative approach to investigate the dimensions and barriers to CC services adoption in 147 national and international organisations. This research investigation delivers how the adoption of CC services is associated with four factors, i.e., environmental, human, organisational, and technological factors, and their eleven respective variables, i.e., external support, competitive pressure, senior management support, employees cloud knowledge, adequate resources, information intensity, relative advantage, complexity, compatibility, security/privacy, and cost evaluation through quantitative study, and outlines the results of the data analysis.

Collected data established the structure of the research model. This research is part of a more considerable investigation, and the discussion shows the selected explanations. We accomplished a foundation investigation in the first phase of the study. Furthermore, to authenticate the developed research model and to present the outcomes of the hypotheses in Chapter 4 included a discussion of the overall findings.

7.2 Quantitative Data Collection and Results

The quantitative data collection is done by administering a survey (see appendix-A). The study has four factors and eleven variables concerning CC services' secure and cost-effective adoption.

The first factor is environmental, which has two variables. The first variable is external support, with three questions about staff training and technical support. In contrast, the second variable is competitive pressure, particularly competitor pressure and technology support.

The second factor is a human factor with two variables, i.e., senior management support with three questions specific to the role concerning reviewing, monitoring, and resources required for CC adoption, and employees cloud knowledge with three questions specific to expertise, training, and awareness.

The third factor is organisational, which has two variables, i.e., adequate resources, which have two questions specific to resources and budget, and information intensity, which has three questions specific to information access, reliability, and up-to-date.

The fourth factor is technology which has five variables. Its first variable is a relative advantage with five questions specific to the confidentiality of data, organisational operational efficiency, data storage capacity, CC payment model, and usage of the latest technologies. Its second variable is complexity which has four questions specific to performance, standardisation, plan/funding, and business plan. The third variable is compatibility which has three questions specific to organisations norms/culture, compatible aspects, and IT infrastructure. The fourth variable is security and privacy, which have six questions specific to secure services, transmission media safety, new technology challenges, data safety/reliability, ensured encryption/data plan, and penetration testing. The fifth variable is evaluating cost, which has four questions specific to improving productivity, software updating cost reduction, computing resources cost reduction, and less CC services cost.

7.2.1 Response Rate: The survey's response rate is the percentage of following valid responses out of the total number of questionnaires link distributed. Researchers are unclassified about a reasonable response rate (Ann, 2005). At the same time, the response rate is also an element of the study. A lower response rate also affects the reliability of the research (William et al., 2013) (Ali, 2010), (Brett, Andrys and Ted, 2012). Therefore, the response rate of the question becomes critical. In this study, the web link questionnaire from the survey monkey website was sent through email to 315 carefully selected organisations globally (see 'Sampling Frame' in chapter 3) and, in total, received 158 responses, reflecting an initial response rate of 50%. After the data screening process, valid responses are 147, with a response rate of 47%.

The reasons for the low response rate (Ann, 2005) are either the respondent is reluctant to participate or the questionnaire needs to be received. Therefore, not much could be done about the former reason but must ensure made all efforts so that the respondents receive the questionnaire because sometimes researchers cannot reach respondents or communication blockades could decrease the response rate (William et al., 2013).

7.3 Company Scope

Table 7.1 represents the company scope in the field of CC in the study. Of the 107 companies, 72.79% reported that they were National Level, 39 companies, with 26.53%, were Multinational, and 1, with 0.68%, and reported an unknown scope.

Company Scope	Frequency	Percentage	Cumulative %
National	107	72.79%	72.79%
Multinational	39	26.53%	99.32%
Don't Know	1	0.68%	100.00%
Total →	**147**	**100%**	

Table 7.1: Companies Scope

7.4 Respondents' and Firms' Demographics

The survey was carried out through the SurveyMonkey website. Received clean 147 responses out of 158 national and international respondents participated from different IT fields with experience in IT and cloud as well.

7.4.1 Respondents' Demographics

The respondent demographics data replicate the roles in the field of IT, understanding related to CC, their total years of work experience, and experience associated with the CC field. Each respondent addressed demographic data in the following.

A. **Role in the field of IT**

Table 7.2 shows the participant's roles in the field of IT in the research.

- 49 respondents, with 33.33%, are in the multi roles category, i.e., Application Developer, Assistance Support Manager, Assistant Manager, Assistant Support Manager, Business Development Executive, Business Development Director, CEO, Client Integration Manager B2B, Computer System Analyst, Cyber Security Analyst, Database Administrator, Development Manager, Director IT, IT Head, IT Security Analyst, IT Support Manager, IT Systems Engineer, Lead System Analyst, Manager Information System, Manager Operation IT, Manager Quality Assurance, Manager System Support, Network Architecture, Operations Lead, Oracle DBA, Product Specialist, Project Manager IT, Senior Infrastructure Developer, Senior Manager Data And Analytics, Solutions Manager, System Engineer, System Solutions Engineer, System Support Engineer, Systems Analysis, Systems Analyst, Systems Engineer, Systems Support Engineer, Systems Support Manager, and Telecom Consultant each responded;

    - 21 respondents with, 14.30%, are in the IT Manager role category.
    - 18 respondents with, 12.24%, are in the IT Consultant role category.
    - 18 respondents with, 12.24%, are in ITC/PM/SSM roles category (IT Coordinator, Project Manager, and System Support Manager).
    - 16 respondents with, 10.88%, are in ITD/ITSE/ITSS roles category (IT Director, IT Support Engineer, IT Support Specialist, and System Solution Manager).
    - 14 respondents with, 9.53%, are in the IT Specialist role category;
    - 6 respondents with, 4.08%, are in the Software Engineer role category.
    - 5 respondents with, 3.40%, are in MIT/SA roles category (Manager IT and System Analyst). The data reflects that different levels of people in the IT field responded to the study.

Participants IT Field Role	Frequency	Percentage
MIT / SA	5	3.40%
Software Engineer	6	4.08%
IT Specialist	14	9.53%
ITD/ITSE/ITSS	16	10.88%
ITC/PM/SSM	18	12.24%
IT Consultant	18	12.24%
IT Manager	21	14.30%
Multi Roles	49	33.33%
Total →	**147**	**100%**

Table 7.2: IT Field Roles

B. **IT Job Experience in Years.**

Table 7.3 shows the respondent's IT job experience in years.

- 62 respondents, with 42.18%, reported an IT experience between 10-14 years.
- 50 respondents, with 34.01%, and IT experience between 15-20 years.
- 27 respondents, with 18.37%, and IT experience between 1-9 years.
- 8 respondents, with 5.44%, and IT experience above 20 years.

These results show that most respondents have considerable IT-related experience.

IT Experience Categories	Frequency	Percentage	Cumulative %
1 - 9 Years	27	18.37%	18.37%
10 - 14 Years	62	42.18%	60.55%
15 - 20 Years	50	34.01%	94.56%
Above 20 Years	8	5.44%	100.00%
Total →	**147**	100.00%	**100%**

Table 7.3: Total IT Job Experience in Years.

C. **Cloud Computing Job Experience in Years.**

Table 7.4 shows the respondents' CC experience in years.

- 95 respondents, with 64.63%, have a CC experience between 4-7 years,
- 35 respondents, with 23.81%, a CC experience between 1-3 years,
- 15 respondents, with 10.20%, a CC experience above 8 and
- Only 2 respondents, 1.36%, has no CC experience.

These results show that over half of the respondents have considerable CC services experience.

Cloud Experience Categories	Frequency	Percentage	Cumulative %
Zero Experience	2	1.36%	1.36%
1 - 3 Years	35	23.81%	25.17%
4 - 7 Years	95	64.63%	89.80%
Above 8 Years	15	10.20%	100.00%
Total →	**147**	100.00%	

Table 7.4: CC Job Experience.

7.4.2 Firm's Demographics

The firm's demographics data in this research comprises the size of the organisation, organisation adopted CC, the current level of CC services adoption, the category of cloud service/delivery model, the type of CC deployment model, CC-based applications used by organisation, and organisation planning to adopt a CC based services solution. Each firms' addressed demographic data in the following.

7.4.2.1 Size of the organisation with respect to number of employees.

Table 7.5 shows the size of the organisations that participated in the study.

- 52 respondents, with 35.37%, are from medium size of organisations (20 – 100).
- 44 respondents, with 29.93%, are from large size organisations (100 – 1000).
- 31 respondents, with 21.09%, are from very large size of organisations (above than 1000).
- 20 respondents, with 13.61%, are from small size of organisations (less than 20).
- Whereas under the "not sure" category there is no respondent.
- The encouraging results show that more than 78.91% of respondents from small and medium size organisations i.e. less than 20, 20 – 100, and 100 - 1000.

Organisation size regards to number of employees	Frequency	Percentage
Less than 20	20	13.61%
20 – 100	52	35.37%
100 – 1000	44	29.93%
Above than 1000	31	21.09%
Not sure	0	0.00%
Total →	**147**	**100%**

Table 7.5: Organisations Size.

7.4.2.2 Organisation adopted CC technology

Table 7.6 shows the organisation that has adopted CC; of almost 124 respondents, 84.35% had adopted CC technology, and of the 23 respondents, 15.65% had not.

Organisation Adopted CC	Frequency	Percentage
Yes	124	84.35%
No	23	15.65%
Total →	**147**	**100%**

Table 7.6: Organisation adopted CC

7.4.2.3 The current level of CC deployment within the organisation.

Table 7.7 shows the current organisation level of CC deployment in the study.

- 124 a very large number of respondents, 84.35%, reported, "We have already adopted some cloud services."
- A small number of 11 respondents, with 7.48%, reported, "Are in the Implementing processes."
- 10 respondents, 6.81% reported: "We intend to adopt cloud services in the next 3 years",
- 2 respondents, 1.36%, reported, "We don't intend to adopt any cloud services in the near future" and finally, in the "other" category resulted in zero.
- The lowest level of respondents still have no plan in the near future about the CC adoption, and it has a 1.36% share of the survey result,
- Whereas the highest number, 84.35% of respondents using some services of CC.

Organisation Current Level of CC deployment	Frequency	Percentage
We have already adopted some cloud services	124	84.35%
Are in the processes of Implementing	11	7.48%
We intend to adopt cloud services in the next 3 years	10	6.81%
We don't intend to adopt any cloud services in near future	2	1.36%
Other (please specify)	0	0.00%
Total →	**147**	**100 %**

Table 7.7: Organisation Current Level of CC Deployment

7.4.2.4 Type of organisation cloud service/delivery model

Table 7.8 shows the cloud service/delivery models the organisation used in the study.

- 135 respondents, 52.94%, used SaaS as their preferred service model.
- Second, the largest, comprising 71 respondents, 27.84% of the sample, used IaaS as the preferred service model.
- The third position included 43 respondents 16.86% used PaaS as a service model.
- Only 6 respondents, 2.36%, used other types of service models.

- These results specify that organisations are more likely to use cloud applications and software.

Type of cloud service model	Frequency	Percentage
Software-as-a-Service (SaaS)	135	52.94%
Platform-as-a-Service (PaaS)	43	16.86%
Infrastructure-as-a-Service (IaaS)	71	27.84%
Others	6	2.36%

Table 7.8: Type of cloud service model

7.4.2.5 Type of organisation cloud deployment model

Table 7.9 shows the types of cloud deployment models that organisation use in the study.

- 89 respondents, 36.32%, prefer private cloud.
- 86 respondents, 35.10%, prefer hybrid cloud.
- Whereas 59 respondents, 24.08%, preferred the public cloud.
- 11 respondents, 4.50%, choose community cloud.
- Finally, none of the respondents used other clouds.

Organisation cloud deployment model	Frequency	Percentage
Private cloud	89	36.32%
Hybrid cloud	86	35.10%
Public cloud	59	24.08%
Community cloud	11	4.50%
Others	0	0.00%

Table 7.9: Organisation cloud deployment model

7.5 Organisation used cloud service providers

Table 7.10 shows the CSP services used in the organisation in this study.

- 136 respondents, 45.18%, prefer service from Microsoft,
- 53 respondents, 17.61%, prefer service from Amazon.
- 37 respondents, 12.29%, prefer service from Google.
- 35 respondents, 11.64%, prefer service from Salesforce.
- 20 respondents, 6.64%, prefer service from Rackspace and other CSPs.

Cloud service providers	Frequency	Percentage
Microsoft	136	45.18%
Amazon	53	17.61%
Google	37	12.29%
Salesforce	35	11.64%
Others	20	6.64%
Rackspace	20	6.64%

Table 7.10: Cloud service providers

7.6 Organisation Adopted CC Services

Table 7.11 shows the CC services adopted in the organisation in this study.

- 138 respondents, 30.40%, preferred Microsoft Office 365 service.
- 86 respondents, 18.94%, preferred One Drive service.
- 71 respondents, 15.64%, preferred Dropbox service.
- 50 respondents, 11.01%, preferred iCloud service.
- 45 respondents, 9.91%, preferred Amazon Web Services service.
- 40 respondents, 8.81%, preferred Google Drive.
- 10 respondents, 2.20%, preferred Oracle Financials service.
- 8 respondents, 1.77%, preferred other services.
- Finally, 6 respondents, 1.32%, preferred Box.

Organisation Adopted CC services	Frequency	Percentage
Microsoft Office 365	138	30.40%
One Drive	86	18.94%
Dropbox	71	15.64%
iCloud	50	11.01%
Amazon Web Services	45	9.91%
Google Drive	40	8.81%
Oracle Financials	10	2.20%
Others	8	1.77%
Box	6	1.32%

Table 7.11: Organisation Adopted CC services

7.7 Organisation Main Sector

Table 7.12 shows the organisations that participated the main sector-wise in this study.

- 29 respondents, 19.74%, were from the telecommunication and technology sector.
- 17 respondents, 11.56%, were from the legal and professional services sector and banking & financial sectors, respectively.
- 13 respondents, 8.5%, were from the agriculture and food industries sector.
- 10 respondents, 6.80%, were from the education, media & publishing, and other sectors, respectively,
- 9 respondents, 6.12%, were from the healthcare sector.
- 7 respondents, 4.77%, were from the transport sector.
- 6 respondents, 4.08%, from the manufacturing, and energy & utility sectors, respectively.
- 5 respondents, 3.40%, from the real estate development sector, and
- 2 respondents, 2.72%, from the petrochemical industry and government sectors, respectively.

The statistics reflect the good number of business sector respondents in this research.

Organisation Main Sectors	Frequency	Percentage
Telecommunication & Technology	29	19.74%
Legal and professional services	17	11.56%
Banking & Financial	17	11.56%
Agriculture & Food Industries	13	8.85%
Education	10	6.80%
Media & Publishing	10	6.80%
Others	10	6.80%
Healthcare	9	6.12%
Transport	7	4.77%
Manufacturing	6	4.08%
Energy & Utility	6	4.08%
Real Estate Development	5	3.40%
Petrochemical Industry	4	2.72%
Government	4	2.72%

Table 7.12: Organisation Main Sectors

7.8 Descriptive Statistics

Descriptive statistics are vital to data analysis (Barbara and Linda, 2018) and can be used to define the respondents' and organisations demographics. Therefore, for statistics, SPSS version 26 calculates the means and standard deviation of the study model variables characterised in the research survey. To analyse the variables used A 5-point Likert scale.

Table 7.13 represents the extent of the mean and the series of the standard deviation variables used to measure the factor and their respective variables. Statisticians have defined that values no more significant than two standard deviations characterise measurements that are more likely near the actual value than those that fall in the extent more important than two standard deviations.

Code	Scale Items	Mean	Std. Deviation
External Support			
Ext_Sup_1	Organisations must ensure that they have adequate technical support before adopting CC.	3.76	1.070
Ext_Sup_2	Organisations must ensure that they have adequate technical support after adopting CC.	3.86	.860
Ext_Sup_3	Organisations have to provide staff training from cloud providers or other training institutions.	3.76	.960
Competitive Pressure			
Comp_Pres_1	Organisations encounter pressure from competitors to adopt CC technology?	2.78	1.063
Comp_Pres_2	CC technology helps organisation gain and competitive edge?	2.85	1.069
Senior Management Support			
Snr_Mng_Sup_1	Senior management is involved in reviewing CC consultant's recommendations.	3.39	1.196
Snr_Mng_Sup_2	Senior management has a role to play in the monitoring of CC adoption projects.	3.74	.966
Snr_Mng_Sup_3	Senior management support is needed to ensure that the resources needed to adopt a technology or to expand its use, are available.	4.10	1.181
Employees Cloud Knowledge			
Emp_Cld_Knw_1	Organisations should be concerned about the lack of cloud knowledge or expertise.	3.44	1.250

Emp_Cld_Knw_2	Staff need to be trained in order to use the CC.	3.82	.965
Emp_Cld_Knw_3	Organisations should create staff awareness of using CC.	3.91	.827
Adequate Resources			
Adq_Res_1	Organisations should have enough resources to provide high speed and reliable internet for CC.	3.77	1.325
Adq_Res_2	Organisations should have an adequate budget for CC adoption.	3.54	1.245
Information Intensity			
Inf_Int_1	Organisations should have fast information access, whenever & wherever they need.	4.00	.914
Inf_Int_2	Organisations should have reliable, relevant and accurate information.	3.90	.858
Inf_Int_3	Organisations should have up-to-date information all the time.	3.79	.846
Relative Advantage			
Rel_Adv_1	The integrity and confidentiality of data is preserved under the CC model.	3.93	.944
Rel_Adv_2	CC improves an organisations operational efficiencies, productivity and enables them to accomplish tasks more quickly.	3.82	.881
Rel_Adv_3	CC would enhance an organisations data storage capacity whenever needed.	4.22	.888
Rel_Adv_4	The pay-as-you-go model of payment makes CC an attractive solution.	3.66	.910
Rel_Adv_5	CC enables staff to use the latest versions of technology to improve their performance.	3.81	1.125

Complexity			
Complexity_1	Organisations should be concerned with the level of professional skill and capability to evaluate cloud solutions.	3.48	1.224
Complexity_2	Organisations should be concerned about the level of standardisation in CC?	3.48	1.049
Complexity_3	Organisations should have a clear plan and funding.	3.94	.751
Complexity_4	Organisations should understand the business case for cloud adoption.	3.78	.997
Compatibility			
Compatibility_1	CC should be compatible with an organisations norms and culture.	3.09	1.475
Compatibility_2	CC should be compatible with all aspects of the organisations work.	3.22	1.150
Compatibility_3	Cloud should be easily integrated into an organisations existing IT Infrastructure.	3.59	1.127
Security and Privacy			
Sec_Pri_1	Organisations should ensure that the servers, data centres and data services provided by the CSPs are secure.	4.16	.922
Sec_Pri_2	Organisations should ensure that the media used to transmit valuable data to cloud data centres is secure and confidentiality of data is maintained by the CSPs.	4.38	.855
Sec_Pri_3	The data security and confidentiality of the information is the biggest challenge faced by an organisation adopting any new technology.	4.51	.924

Sec_Pri_4	A contract agreement between the organisation and the CSP should ensure the safety and reliability of the data.	4.12	.730
Sec_Pri_5	Organisations ensure the CSP confirms to the ISO 27001 security standard, which ensures the data held is encrypted, stored securely and there is a backup plan.	3.98	.798
Sec_Pri_6	Organisations should carry out penetration testing to check the security of CSP and also obtain reports from CSPs on security breaches that might affect the organisations data.	3.82	.825
Evaluating Cost			
Eva_Cst_1	CC should facilitate organisations to focus on modern IT system projects, which aim to reduce capital investment and improve productivity.	3.67	.952
Eva_Cst_2	CC should provide opportunities for innovation, reduction in IT infrastructure and eliminates the cost of upgrading the software.	3.82	.836
Eva_Cst_3	CC reduces the cost of system maintenance, IT costs (such as IT personnel) and reduction in total cost of computing resources.	3.71	.885
Eva_Cst_4	Costs of using CC are less than the cost of purchasing and maintaining systems in house.	3.65	.882
CC Adoption			

Cld_Comp_Adop_1	The organisation was able to reduce the software development time and cost of hardware.	3.90	.659
Cld_Comp_Adop_2	The organisation's performance has improved gradually with better communication with suppliers and customers.	4.03	.753
Cld_Comp_Adop_3	Low upfront investments as well as predictable and scalable operation expenses of CC.	3.86	.712
Cld_Comp_Adop_4	CC increased the ability of the organisation to adopt rapidly and cost efficiently in response to changes in the business environment.	4.03	.608
Cld_Comp_Adop_5	Organisations consider CC as a reliable and secure service than traditional computing.	3.99	.672
Cld_Comp_Adop_6	Using CC services can facilitate organisations to focus on core business activities rather than on IT operations.	3.93	.631
Cld_Comp_Adop_7	Access to services from anywhere and from/across different platforms without putting too much investment prior to the needs.	4.40	.841
Cld_Comp_Adop_8	Employee’s performance, satisfaction and loyalty ratings have increased.	3.70	.831
Cld_Comp_Adop_9	The business goals of the organisation have been successfully accomplished.	3.97	.585

Table 7.13: Descriptive statistics

7.9 Measurement Development of the Research Model

Applied statistical methods to investigate the data for the suggested investigation model calculation. The first statistical method is to certify the scales' strength concluded FA test and used FA tests to confirm the validity measures. FA test is an effective tool engaged in perfection, valuation of tests, and scales (Alain et al., 2009). This method comprises exploratory factor analysis (EFA). The second statistical method is to test the scales' reliability and strength to certify the internal consistency (section 7.10).

7.9.1 First Statistical Technique: Exploratory factor analysis (EFA)

EFA is a broadly employed statistical methodology in IS, education, and social science (Alain et al., 2009). In this research, the survey factors used their variables to conclude the main concepts of the projected research model. Some of these factors and their variables were adopted from earlier studies, and others were taken from participants in the qualitative phase of the research, as illustrated in Section (4.6.1) of the methodology chapter. Hence, EFA was used in this research (Kristine, Constance and Karen, 2005).

It is significant to note that in EFA, trail size is appropriately substantial (Brett, Andrys and Ted, 2012). Revealed several perceptions and procedures concerning the trial size of EFA in the literature review (Joseph et al., 2014), (Ali, 2010), (Barbara and Linda, 2018), (Andrew and Howard, 2016), suggested that the trial size of the EFA must be greater than 100 cases. Other analysts suggested that the trial size would be a minimum of 300 points for EFA (Andrew and Howard, 2016). A study showed by (Mark, Elena and Marjorie, 2004) categorised the trial size of the EFA as 100 is a poor trial size; 200 is a reasonable trial size; 300 is a decent trial size; 500 is a very proper trial size, and 1000 or extra is a perfect trial size. The trial size used in this study is roughly 147 cases. If it is associated with the types put forward by (Mark, Elena and Marjorie, 2004); the trial is considered fair and appropriate for EFA.

I. External Support

They used three variables to measure external support. Facts portray in Table 7.14 shows the correlation matrix for these variables. Table 7.14 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.14, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Exp_Supp_1	Exp_Supp_2	Exp_Supp_3
Exp_Supp_1	1.000	.646	.649
Exp_Supp_2	.646	1.000	.672
Exp_Supp_3	.649	.672	1.000

Table 7.14: Correlation and loading matrix for external support

Table 7.15 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.732, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflect to be moderately suitable for EFA.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.732
Bartlett's Test of Sphericity	Approx. Chi-Square	187.037
	df	3
	Sig.	<.001

Table 7.15: (External Support) KMO and Bartlett's Test for Compatibility

Table 7.16 specifies that there was only one element with an eigenvalue of 2.312.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.312	77.055	77.055	2.312	77.055	77.055
2	.360	12.003	89.058			
3	.328	10.942	100.000			

Extraction Method: Principal Component Analysis.

Table 7.16: Eigenvalue for Compatibility (External Support)

II. Competitive Pressure

Used three variables to measure senior management support. Facts portray in Table 7.20 shows the correlation matrix for these variables. Table 7.20 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.20, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Comp_Pres_1	Comp_Pres_2
Comp_Pres_1	1.000	.707
Comp_Pres_2	.707	1.000

Table 7.17: (Competitive Pressure) Correlation and loading matrix for Compatibility

Table 7.18 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.500, equal to a suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is worthy of p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	99.973
	df	1
	Sig.	<.001

Table 7.18: (Competitive Pressure) KMO and Bartlett's Test for Compatibility

Table 7.19 specifies that there was only one element with an eigenvalue of 1.707.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.707	85.332	85.332	1.707	85.332	85.332
2	.293	14.668	100.000			

Extraction Method: Principal Component Analysis.

Table 7.19: (Competitive Pressure) Eigenvalue for Compatibility

III. Senior Management Support

Used three variables to measure senior management support. Facts portray in Table 7.20 shows the correlation matrix for these variables. Table 7.20 reflects the correlation matrix of these variables is greater than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be more significant 0.50, and as presented in Table 7.20 the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Snr_Mng_Sup_1	Snr_Mng_Sup_2	Snr_Mng_Sup_3
Snr_Mng_Sup_1	1.000	.568	.728
Snr_Mng_Sup_2	.568	1.000	.498
Snr_Mng_Sup_3	.728	.498	1.000

Table 7.20: (Senior Management Support) Correlation and loading matrix for Compatibility

Table 7.21 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.674, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.674
Bartlett's Test of Sphericity	Approx. Chi-Square	168.379
	Df	3
	Sig.	<.001

Table 7.21: (Senior Management Support) KMO and Bartlett's Test for Compatibility

Table 7.22 specifies that there was only one element with an eigenvalue of 2.201.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.201	73.381	73.381	2.201	73.381	73.381
2	.534	17.801	91.182			
3	.265	8.818	100.000			

Extraction Method: Principal Component Analysis.

Table 7.22: (Senior Management Support) Eigenvalue for Compatibility

IV. Employees Cloud Knowledge

Used three variables to measure employee's cloud knowledge. Facts portray in Table 7.23 shows the correlation matrix for these variables. Table 7.23 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.23, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Emp_Cld_Knw_1	Emp_Cld_Knw_2	Emp_Cld_Knw_3
Emp_Cld_Knw_1	1.000	.663	.634
Emp_Cld_Knw_2	.663	1.000	.511
Emp_Cld_Knw_3	.634	.511	1.000

Table 7.23: (Employees Cloud Knowledge) Correlation and loading matrix for Compatibility

Table 7.24 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.690, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.690
Bartlett's Test of Sphericity	Approx. Chi-Square	161.085
	df	3
	Sig.	<.001

Table 7.24: (Employees Cloud Knowledge) KMO and Bartlett's Test for Compatibility

Table 7.25 specifies that there was only one element with an eigenvalue of 2.208.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.208	73.588	73.588	2.208	73.588	73.588
2	.490	16.329	89.916			
3	.303	10.084	100.000			

Extraction Method: Principal Component Analysis.

Table 7.25: (Employees Cloud Knowledge) Eigenvalue for Compatibility

V. Adequate Resources

Used two variables to measure Adequate Resources. Facts portray in Table 7.26 shows the correlation matrix for these variables. Table 7.26 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.26, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Adq_Res_1	Adq_Res_2
Adq_Res_1	1.000	.849
Adq_Res_2	.849	1.000

Table 7.26: (Adequate Resources) Correlation & loading matrix for Compatibility

Table 7.27 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.500, which is equal to a suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is worthy of $p<.05$ (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	184.459
	df	1
	Sig.	<.001

Table 7.27: (Adequate Resources) KMO and Bartlett's Test for Compatibility

Table 7.28 specifies that there was only one element with an eigenvalue of 1.849.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.849	92.456	92.456	1.849	92.456	92.456
2	.151	7.544	100.000			

Extraction Method: Principal Component Analysis.

Table 7.28: (Adequate Resources) Eigenvalue for Compatibility

VI. Information Intensity

Used three variables to measure Information Intensity. Facts portray in Table 7.29 shows the correlation matrix for these variables. Table 7.29 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.29, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Inf_Int_1	Inf_Int_2	Inf_Int_3
Inf_Int_1	1.000	.769	.762
Inf_Int_2	.769	1.000	.810
Inf_Int_3	.762	.810	1.000

Table 7.29: (Information Intensity) Correlation and loading matrix for Compatibility

Table 7.30 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.756, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.756
Bartlett's Test of Sphericity	Approx. Chi-Square	304.089
	df	3
	Sig.	<.001

Table 7.30: (Information Intensity) KMO and Bartlett's Test for Compatibility

Table 7.31 specifies that there was only one element with an eigenvalue of 2.560.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.560	85.350	85.350	2.560	85.350	85.350
2	.250	8.330	93.679			
3	.190	6.321	100.000			

Extraction Method: Principal Component Analysis.

Table 7.31: (Information Intensity) Eigenvalue for Compatibility

VII. Relative Advantage

Used five variables to measure Relative Advantage. Facts portray in Table 7.32 shows the correlation matrix for these variables. Table 7.32 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.32, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Rel_Adv_1	Rel_Adv_2	Rel_Adv_3	Rel_Adv_4	Rel_Adv_5
Rel_Adv_1	1.000	.766	.649	.783	.812
Rel_Adv_2	.766	1.000	.732	.770	.698
Rel_Adv_3	.649	.732	1.000	.694	.652
Rel_Adv_4	.783	.770	.694	1.000	.719
Rel_Adv_5	.812	.698	.652	.719	1.000

Table 7.32: (Relative Advantage) Correlation and loading matrix for Compatibility

Table 7.33 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.877, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.877
Bartlett's Test of Sphericity	Approx. Chi-Square	585.546
	Df	10
	Sig.	<.001

Table 7.33: (Relative Advantage) KMO and Bartlett's Test for Compatibility

Table 7.34 specifies that there was only one element with an eigenvalue of 3.913.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.913	78.261	78.261	3.913	78.261	78.261
2	.412	8.233	86.494			
3	.289	5.787	92.281			
4	.224	4.485	96.766			
5	.162	3.234	100.000			

Extraction Method: Principal Component Analysis.

Table 7.34: (Relative Advantage) Eigenvalue for Compatibility

VIII. Complexity

Used four variables to measure Complexity Facts portray in Table 7.35 shows the correlation matrix for these variables. Table 7.35 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.35, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Complexity_1	Complexity_2	Complexity_3	Complexity_4
Complexity_1	1.000	.655	.732	.761
Complexity_2	.655	1.000	.550	.520
Complexity_3	.732	.550	1.000	.732
Complexity_4	.761	.520	.732	1.000

Table 7.35: (Complexity) Correlation and loading matrix for Compatibility

Table 7.36 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.809, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.809
Bartlett's Test of Sphericity	Approx. Chi-Square	342.520
	df	6
	Sig.	<.001

Table 7.36: (Complexity) KMO and Bartlett's Test for Compatibility

Table 7.37 specifies that there was only one element with an eigenvalue of 2.984.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.984	74.610	74.610	2.984	74.610	74.610
2	.526	13.161	87.770			
3	.276	6.903	94.674			
4	.213	5.326	100.000			

Extraction Method: Principal Component Analysis.

Table 7.37: (Complexity) Eigenvalue for Compatibility

IX. Compatibility

Used three variables to measure Compatibility. Facts portray in Table 7.38 shows the correlation matrix for these variables. Table 7.38 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.38, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Compatibility_1	Compatibility_2	Compatibility_3
Compatibility_1	1.000	.735	.594
Compatibility_2	.735	1.000	.566
Compatibility_3	.594	.566	1.000

Table 7.38: (Compatibility) Correlation and loading matrix for Compatibility

Table 7.39 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.700, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.700
Bartlett's Test of Sphericity	Approx. Chi-Square	183.307
	df	3
	Sig.	<.001

Table 7.39: (Compatibility) KMO and Bartlett's Test for Compatibility

Table 7.40 specifies that there was only one element with an eigenvalue of 2.267.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.267	75.557	75.557	2.267	75.557	75.557
2	.470	15.673	91.230			
3	.263	8.770	100.000			

Extraction Method: Principal Component Analysis.

Table 7.40: (Compatibility) Eigenvalue for Compatibility

X. Security and Privacy

Used six variables measure Security and Privacy. Facts portray in Table 7.41 shows the correlation matrix for these variables. Table 7.41 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.41, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Sec_Priv_1	Sec_Priv_2	Sec_Priv_3	Sec_Priv_4	Sec_Priv_5	Sec_Priv_6
Sec_Priv_1	1.000	.755	.738	.723	.787	.506
Sec_Priv_2	.755	1.000	.741	.583	.674	.494
Sec_Priv_3	.738	.741	1.000	.709	.711	.451
Sec_Priv_4	.723	.583	.709	1.000	.722	.502
Sec_Priv_5	.787	.674	.711	.722	1.000	.535
Sec_Priv_6	.506	.494	.451	.502	.535	1.000

Table 7.41: (Security and Privacy) Correlation & loading matrix for Compatibility

Table 7.42 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.888, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.888
Bartlett's Test of Sphericity	Approx. Chi-Square	614.367
	df	15
	Sig.	<.001

Table 7.42: (Security and Privacy) KMO and Bartlett's Test for Compatibility

Table 7.43 specifies that there was only one element with an eigenvalue of 4.242.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.242	70.700	70.700	4.242	70.700	70.700
2	.629	10.484	81.184			
3	.427	7.116	88.299			
4	.297	4.949	93.248			
5	.226	3.771	97.019			
6	.179	2.981	100.000			

Extraction Method: Principal Component Analysis.

Table 7.43: (Security and Privacy) Eigenvalue for Compatibility

XI. Evaluating Cost

Used four variables to measure Evaluating Cost. Facts portray in Table 7.44 shows the correlation matrix for these variables. Table 7.44 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.44, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	Eva_Cst_1	Eva_Cst_2	Eva_Cst_3	Eva_Cst_4
Eva_Cst_1	1.000	.828	.764	.751
Eva_Cst_2	.828	1.000	.769	.701
Eva_Cst_3	.764	.769	1.000	.691
Eva_Cst_4	.751	.701	.691	1.000

Table 7.44: (Evaluating Cost) Correlation and loading matrix for Compatibility

Table 7.45 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.848, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.848
Bartlett's Test of Sphericity	Approx. Chi-Square	447.060
	df	6
	Sig.	<.001

Table 7.45: (Evaluating Cost) KMO and Bartlett's Test for Compatibility

Table 7.46 specifies that there was only one element with an eigenvalue of 3.253.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.253	81.332	81.332	3.253	81.332	81.332
2	.329	8.228	89.560			
3	.252	6.299	95.859			
4	.166	4.141	100.000			

Extraction Method: Principal Component Analysis.

Table 7.46: (Evaluating Cost) Eigenvalue for Compatibility

XII. CC Adoption

Used nine variables to measure CC Adoption. Facts portray in Table 7.47 shows the correlation matrix for these variables. Table 7.47 reflects the correlation matrix of these variables is more significant than 0.30, which shows that the data is moderately suitable for the EFA of these items (Cheng and Jasbir, 2009). The factor loading should be greater than 0.50, and as presented in Table 7.47, the loading of these variables greater than 0.50, which goes beyond the cut-off level (Joe, 1995).

Inter-Item Correlation Matrix for Compatibility

	CC_Adop_1	CC_Adop_2	CC_Adop_3	CC_Adop_4	CC_Adop_5	CC_Adop_6	CC_Adop_7	CC_Adop_8	CC_Adop_9
CC_Adop_1	1.000	.683	.655	.725	.692	.706	.754	.669	.757
CC_Adop_2	.683	1.000	.686	.716	.664	.639	.540	.553	.655
CC_Adop_3	.655	.686	1.000	.706	.654	.601	.485	.552	.698
CC_Adop_4	.725	.716	.706	1.000	.638	.702	.582	.505	.735
CC_Adop_5	.692	.664	.654	.638	1.000	.692	.652	.569	.696
CC_Adop_6	.706	.639	.601	.702	.692	1.000	.689	.558	.737
CC_Adop_7	.754	.540	.485	.582	.652	.689	1.000	.565	.663
CC_Adop_8	.669	.553	.552	.505	.569	.558	.565	1.000	.632
CC_Adop_9	.757	.655	.698	.735	.696	.737	.663	.632	1.000

Table 7.47: (CC Adoption) Correlation and loading matrix for Compatibility

Table 7.48 determined the KMO and Bartlett's Test of Sphericity. The value of the KMO is about 0.939, which is more significant than the suitable range of 0.50 (Barbara and Linda, 2018). Bartlett's Test of Sphericity is highly worthy with p<.05 (Cheng and Jasbir, 2009), (Hubert and Thomas, 1989). The provided data of this theory reflected to be moderately suitable for EFA.

KMO and Bartlett's Test for Compatibility

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.939
Bartlett's Test of Sphericity	Approx. Chi-Square	1035.738
	df	36
	Sig.	<.001

Table 7.48: (CC Adoption) KMO and Bartlett's Test for Compatibility

Table 7.49 specifies that there was only one element with an eigenvalue of 6.216.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.216	69.071	69.071	6.216	69.071	69.071
2	.638	7.093	76.164			
3	.514	5.707	81.871			
4	.362	4.027	85.898			
5	.337	3.742	89.640			
6	.303	3.366	93.006			
7	.232	2.578	95.584			
8	.216	2.399	97.983			
9	.182	2.017	100.000			

Extraction Method: Principal Component Analysis.

Table 7.49: (CC Adoption) Eigenvalue for Compatibility

7.10 Reliability and validity of the measures (second statistical techniques)

Reliability is the capability of a measurement mechanism to provide a similar error-free result consistently (Hamed, 2016). Quantitative studies verified the reliability measures to recognise the random error that might be present in the measurement. Cronbach's alpha (α) coefficient is a standard statistical analysis measure used in quantitative investigation studies to examine the reliability of the standards.

Cronbach's alpha measures the reliability among two items of the same research factor.

Four cut-off points established reliability from Cronbach's alpha (α) (Chuck Lance, et.al, 2006), (George, Ioana and Adriana, 20015). They are,

- 0.90 and above - reliability is excellent;
- 0.70 to 0.89 - reliability is high;
- 0.50 to 0.69 - reliability is moderate; and
- below 0.50 - significantly less reliability.

Eleven variables identified Cronbach's alpha (α) and questions in different tables below. Found reliable variables investigation; therefore, no research items were deleted.

7.10.1 Frequency Statistics

A discussion on specific constructs explaining their item frequencies, means, and standard deviations. Resulting in a brief conversation on the frequencies, norms, and standard deviations alongside their item loadings and construct reliability:

1. External Support: The external support variable discusses three items (Ext_Sup_1, Ext_Sup_2, and Ext_Sup_3) related to supporting CC technology (CCT) in organisations. Table 7.50 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

	Frequencies					**Mean**	**SD***	**Rank ****	**Reliability**
Items	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Ext_Supp_1	9	15	7	88	28	3.76	1.070	2	0.846
	6%	10%	5%	60%	19%				
Ext_Supp_2	1	17	9	95	25	3.86	0.860	1	
	1%	12%	6%	65%	17%				
Ext_Supp_3	8	9	14	95	21	3.76	0.960	3	
	5%	6%	10%	65%	14%				
* Standard Deviations ** Rank									
Ext_Supp_1	Organisations must ensure that they have adequate technical support before adopting CC.								
Ext_Supp_2	Organisations must ensure that they have adequate technical support after adopting CC.								
Ext_Supp_3	Organisations have to provide staff training from cloud providers or other training institutions.								

Table 7.50: External Support Item Statistics

Table 7.50 portrays the mean and standard deviation values for the 3 items; it is coherent that respondents from different organisations most frequently rated that using CCT needs adequate technical support for the smooth operation of the CC environment (Ext_Supp_2) as the primarily supported variable for the organisation; there is Ext_Supp_3; while Ext_Supp_1 is the least supported.

Under 'external support,' results show Cronbach's alpha value of 0.846 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

2. Competitive Pressure: The competitive pressure variable discusses two items (Comp_Pres_1 and Comp_Pres_2) related to the pressure of competition of using CCT in organisations. Table 7.51 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank ****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Comp_Pres_1	17	46	41	38	5	2.78	1.063	2	0.828
	12%	31%	28%	26%	3%				
Comp_Pres_2	16	41	46	37	7	2.85	1.069	1	
	11%	28%	31%	25%	5%				
* Standard Deviations ** Rank									
Comp_Pres_1	Organisations encounter pressure from competitors to adopt CC technology?								
Comp_Pres_2	CC technology helps organisation gain and competitive edge?								

Table 7.51: Competitive Pressure Item Statistics

Table 7.51 portrays the mean and standard deviation values for the two items; it is coherent that respondents from different organisations most frequently rated that using CCT needs technology to gain a competitive edge over the competitor for the adoption of CC environment Comp_Pres_2 as the primary enforced variable for the organisation; while Comp_Pres_1 is the least implemented.

Under ‘competitive pressure’, results show Cronbach’s alpha value of 0.828 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

3. Senior Management Support: The senior management support variable discusses three items (Snr_Mng_Sup_1, Snr_Mng_Sup_2, and Snr_Mng_Sup_3) related to the support of using CCT in organisations. Table 7.52 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Snr_Mng_Supp_1	20	14	15	85	13	3.39	1.196	3	0.818
	14%	10%	10%	58%	9%				
Snr_Mng_Supp_2	6	17	5	100	19	3.74	0.966	2	
	4%	12%	3%	68%	13%				
Snr_Mng_Supp_3	10	11	2	55	69	4.10	1.181	1	
	7%	7%	1%	37%	47%				
* Standard Deviations ** Rank									
Snr_Mng_Supp_1	Senior management is involved in reviewing CC consultant's recommendations.								
Snr_Mng_Supp_2	Senior management has a role to play in the monitoring of CC adoption projects								
Snr_Mng_Supp_3	Senior management support is needed to ensure that the resources needed to adopt a technology or to expand its use, are available.								

Table 7.52: Senior Management Support Item Statistics

Table 7.52 portrays the mean and standard deviation values for the three items; it is coherent that respondents from different organisations most frequently rated that using CCT needs support to ensure resources required to adopt a technology or to expand its use are available for the smooth running of the CC environment (Snr_Mng_Sup_3) as the primarily supported variable for the organisation; there is Snr_Mng_Sup_2; while Snr_Mng_Sup_1 is the least supported.

Under ‘senior management support’, results show Cronbach’s alpha value of 0.818 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

4. Employees Cloud Knowledge: The employee cloud knowledge variable discusses three items (Emp_Cld_Knw_1, Emp_Cld_Knw_2, and Emp_Cld_Knw_3) related to the support of using CCT in organisations. Table 7.53 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Emp_Cld_Knw_1	16	21	20	63	27	3.44	1.250	2	0.810
	11%	14%	14%	43%	18%				
Emp_Cld_Knw_2	6	10	18	84	29	3.82	0.965	3	
	4%	7%	12%	57%	20%				
Emp_Cld_Knw_3	1	10	21	84	31	3.91	0.827	1	
	1%	7%	14%	57%	21%				
* Standard Deviations ** Rank									
Emp_Cld_Knw_1	Organisations should be concerned about the lack of cloud knowledge or expertise.								
Emp_Cld_Knw_2	Staff need to be trained in order to use the CC.								
Emp_Cld_Knw_3	Organisations should create staff awareness of using CC.								

Table 7.53: Employees Cloud Knowledge Item Statistics

Table 7.53 portrays the mean and standard deviation values for the three items; it is coherent that respondents from different organisations most frequently rated that using CCT needs to create staff awareness of using CC for the smooth running of the CC environment (Emp_Cld_Knw_3) as the primarily supported variable for the organisation; there is Emp_Cld_Knw_1; while Emp_Cld_Knw_3 is the least supported.

The overall results under 'employees cloud knowledge' show Cronbach's alpha value of 0.810 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

5. Adequate Resources: The adequate resources variable discusses two items (Adq_Res_1, and Adq_Res__2) related to the resources for using CCT in organisations. Table 7.54 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank ****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Adq_Res_1	13	20	11	47	56	3.77	1.325	1	0.917
	9%	14%	7%	32%	38%				
Adq_Res_2	16	17	15	69	30	3.54	1.245	2	
	11%	12%	10%	47%	20%				
* Standard Deviations ** Rank *									
Adq_Res_1	Organisations should have enough resources to provide high speed and reliable internet for CC.								
Adq_Res_2	Organisations should have an adequate budget for CC adoption.								

Table 7.54: Adequate Resources Item Statistics

Table 7.54 portrays the mean and standard deviation values for the two items; it is coherent that respondents from different organisations most frequently rated that using CCT needs enough resources to provide reliable internet for the adoption of CC environment (Adq_Res_1) as the primary enforced variable for the organisation; while Adq_Res_2 is the least enforced.

Under ‘adequate resources,’ results show Cronbach’s alpha value of 0.917 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

6. Information Intensity: The information intensity variable, discusses three items (Inf_Int_1, Inf_Int_2, and Inf_Int_3) related to the support of using CCT in organisations. Table 7.55 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Inf_Int_1	4	11	4	90	38	4.00	0.914	1	0.913
	3%	7%	3%	61%	26%				
Inf_Int_2	4	10	8	100	25	3.90	0.858	2	
	3%	7%	5%	68%	17%				
Inf_Int_3	4	11	14	101	17	3.79	0.846	1	
	3%	7%	10%	69%	12%				
* Standard Deviations ** Rank									
Inf_Int_1	Organisations should have fast information access, whenever & wherever they need.								
Inf_Int_2	Organisations should have reliable, relevant and accurate information.								
Inf_Int_3	Organisations should have up-to-date information all the time.								

Table 7.55: Information Intensity Item Statistics

Table 7.55 portrays the mean and standard25eviation values for the three items; it is coherent that respondents from different organisations most frequently rated that using CCT needs to have fast information access whenever and wherever a need for the smooth running of the CC environment (Inf_Int_1) as the primarily supported variable for the organisation; there is Inf_Int_2; while Inf_Int_3 is the least supported.

Under ‘information intensity,’ results show Cronbach’s alpha value of 0.913 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

7. Relative Advantage: The relative advantage variable discusses five items (Rel_Adv_1, Rel_Adv_2, Rel_Adv_3, Rel_Adv_4, and Rel_Adv_5) related to the support of using CCT in organisations. Table 7.56 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank ****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Rel_Adv_1	8	4	11	92	32	3.93	0.944	2	0.928
	5%	3%	7%	63%	22%				
Rel_Adv_2	6	8	12	101	20	3.82	0.881	3	
	4%	5%	8%	69%	14%				
Rel_Adv_3	2	10	3	71	61	4.22	0.888	1	
	1%	7%	2%	48%	41%				
Rel_Adv_4	8	8	22	97	12	3.66	0.910	5	
	5%	5%	15%	66%	8%				
Rel_Adv_5	12	11	4	86	34	3.81	1.125	4	
	8%	7%	3%	59%	23%				
* Standard Deviations ** Rank									
Rel_Adv_1	The integrity and confidentiality of data is preserved under the CC model.								
Rel_Adv_2	CC improves an organisations operational efficiencies, productivity and enables them to accomplish tasks more quickly.								

Rel_Adv_3	CC would enhance an organisations data storage capacity whenever needed.
Rel_Adv_4	The pay-as-you-go model of payment makes CC an attractive solution.
Rel_Adv_5	CC enables staff to use the latest versions of technology to improve their performance.

Table 7.56: Relative Advantage Item Statistics

Table 7.56 portrays the mean and standard deviation values for the five items; it is coherent that respondents from different organisations most frequently rated that using CCT needs to create staff awareness of using CC for the smooth running of the CC environment (Rel_Adv_3) as the primarily supported variable for the organisation; there are Rel_Adv_1, Rel_Adv_2, Rel_Adv_5; while Rel_Adv_4 is the least supported.

Under the 'relative advantage', show Cronbach's alpha value of 0.928 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

8. Complexity: The complexity variable discusses four items (Complexity_1, Complexity_2, Complexity_3, and Complexity_4) related to the support of using CCT in organisations. Table 7.57 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank ****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Complexity_1	23	6	11	91	16	3.48	1.224	2	0.875
	16%	4%	7%	62%	11%				
Complexity_2	8	26	12	89	12	3.48	1.049	3	
	5%	18%	8%	61%	8%				
Complexity_3	0	13	7	103	24	3.94	0.751	1	
	0%	9%	5%	70%	16%				
Complexity_4	12	3	11	100	21	3.78	0.997	4	
	8%	2%	7%	68%	14%				
* Standard Deviations ** Rank									
Complexity_1	Organisations should be concerned with the level of professional skill and capability to evaluate cloud solutions.								
Complexity_2	Organisations should be concerned about the level of standardisation in CC?								
Complexity_3	Organisations should have a clear plan and funding.								
Complexity_4	Organisations should understand the business case for cloud adoption.								

Table 7.57: Complexity Item Statistics

Table 7.57 portrays the mean and standard deviation values for the four items; it is coherent that respondents from different organisations most frequently rated that using CCT needs to focus on the level of standardisation of using CC for the smooth running of the CC environment (Complexity_3) as the primarily supported variable for the organisation; there are Complexity_1, Complexity_2; while Complexity_4 is the least supported.

The 'complexity' show Cronbach's alpha value of 0.875 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

9. Compatibility: The compatibility variable discusses three items (Compatibility_1, Compatibility_2, and Compatibility_3) related to the support of using CCT in organisations. Table 7.58 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD ***	**Rank ****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Compatibility_1	41	9	14	62	21	3.09	1.475	3	0.832
	28%	6%	10%	42%	14%				
Compatibility_2	17	25	22	75	8	3.22	1.150	2	
	12%	17%	15%	51%	5%				
Compatibility_3	16	10	9	95	17	3.59	1.127	1	
	11%	7%	6%	65%	12%				
* Standard Deviations ** Rank									
Compatibility_1	CC should be compatible with an organisations norms and culture.								
Compatibility_2	CC should be compatible with all aspects of the organisations work.								
Compatibility_3	Cloud should be easily integrated into an organisations existing IT Infrastructure.								

Table 7.58: Compatibility Item Statistics

Table 7.58 portrays the mean and standard deviation values for the three items; it is coherent that respondents from different organisations most frequently rated that using CCT needs to easily integrate into organisations existing IT infrastructure for the smooth running of the CC environment (Compatibility_3) as the primarily supported variable for the organisation; there is Compatibility_2; while Compatibility_1 is the least supported.

The ‘compatibility’ show Cronbach’s alpha value of 0.832 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

10. Security and Privacy: The security and privacy variable discusses six items (Sec_Prv_1, Sec_Prv_2, Sec_Prv_3, Sec_Prv_4, Sec_Prv_5, and Sec_Prv_6) related to the support of using CCT in organisations. Table 7.59 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank ****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Sec_Prv_1	7	1	7	78	54	4.16	0.922	3	0.914
	5%	1%	5%	53%	37%				
Sec_Prv_2	2	5	9	50	81	4.38	0.855	2	
	1%	3%	6%	34%	55%				
Sec_Prv_3	5	4	2	36	100	4.51	0.924	1	
	3%	3%	1%	24%	68%				
Sec_Prv_4	0	9	4	94	40	4.12	0.730	4	
	0.00%	6%	3%	64%	27%				
Sec_Prv_5	3	9	3	105	27	3.98	0.798	5	
	2%	6%	2%	71%	18%				
Sec_Prv_6	3	7	26	88	23	3.82	0.825	6	
	2%	5%	18%	60%	16%				
* Standard Deviations ** Rank									
Sec_Prv_1	Organisations should ensure that the servers, data centres and data services provided by the CSPs are secure.								
Sec_Prv_2	Organisations should ensure that the media used to transmit valuable data to cloud data centres is secure and confidentiality of data is maintained by the CSPs.								
Sec_Prv_3	The data security and confidentiality of the information is the biggest challenge faced by an organisation adopting any new technology.								

Sec_Prv_4	A contract agreement between the organisation and the CSP should ensure the safety and reliability of the data.
Sec_Prv_5	Organisations ensure the CSP confirms to the ISO 27001 security standard, which ensures the data held is encrypted, stored securely and there is a backup plan.
Sec_Prv_6	Organisations should carry out penetration testing to check the security of CSP and also obtain reports from CSPs on security breaches that might affect the organisations data.

Table 7.59: Security and Privacy Item Statistics

Table 7.59 portrays the mean and standard deviation values for the six items; it is coherent that respondents from different organisations most frequently rated that using CCT needs to focus on the data security and confidentiality of the information is the biggest challenge faced by the organisation of using CC for the smooth running of the CC environment (Sec_Prv_3) as the primarily supported variable for the organisation; there are Sec_Prv_2, Sec_Prv_1, Sec_Prv_4, Sec_Prv_5; while Sec_Prv_6 is the least supported.

The ‘security and privacy’ discusses show that Cronbach’s alpha value of 0.914 is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

11. Evaluating Cost: The complexity variable discusses four items (Eva_Cst_1, Eva_Cst_2, Eva_Cst_3, and Eva_Cst_4) related to the support of using CCT in organisations. Table 7.60 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank ****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
Eva_Cst_1	7	15	11	100	14	3.67	0.952	3	0.923
	5%	10%	7%	68%	10%				
Eva_Cst_2	1	17	10	99	20	3.82	0.836	1	
	1%	12%	7%	67%	14%				
Eva_Cst_3	5	14	13	102	13	3.71	0.885	2	
	3%	10%	9%	69%	9%				
Eva_Cst_4	5	13	23	94	12	3.65	0.882	4	
	3%	9%	16%	64%	8%				
* Standard Deviations ** Rank									
Eva_Cst_1	CC should facilitate organisations to focus on modern IT system projects, which aim to reduce capital investment and improve productivity.								
Eva_Cst_2	CC should provide opportunities for innovation, reduction in IT infrastructure and eliminates the cost of upgrading the software.								
Eva_Cst_3	CC reduces the cost of system maintenance, IT costs (such as IT personnel) and reduction in total cost of computing resources.								
Eva_Cst_4	Costs of using CC are less than the cost of purchasing and maintaining systems in house.								

Table 7.60: Evaluating Cost Item Statistics

Table 7.60 portrays the mean and standard deviation values for the four items; it is coherent that respondents from different organisations most frequently rated that using CCT need to reduce the cost of system maintenance, IT costs (such as IT personnel), and reduction in the total computing resources cost of using CC for the smooth running of the CC environment (Eva_Cst_2) as the primarily supported variable for the organisation; there are Eva_Cst_3, Eva_Cst_1; while Eva_Cst_4 is the least supported.

The 'evaluating cost' show that Cronbach's alpha value of 0.923 is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

12. CC Adoption: The CC adoption variable discussed nine items (CC_Adop_1, CC_Adop_2, CC_Adop_3, CC_Adop_4, CC_Adop_5, CC_Adop_6, CC_Adop_7, CC_Adop_8, and CC_Adop_9) related to the support of using CCT in organisations. Table 7.61 represents the frequency distribution of the results accumulated from online survey organisations related to different business sectors for each item monitored by separate item loadings from factor analysis and the construct reliability.

Items	**Frequencies**					**Mean**	**SD***	**Rank ****	**Reliability**
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**				**Alpha**
CC_Adop_1	4	0	16	114	13	3.90	0.659	7	0.939
	3%	0%	11%	78%	9%				
CC_Adop_2	4	0	15	96	32	4.03	0.753	2	
	3%	0%	10%	65%	22%				
CC_Adop_3	4	0	25	102	16	3.86	0.712	8	
	3%	0%	17%	69%	11%				
CC_Adop_4	2	2	7	115	21	4.03	0.608	3	
	1%	1%	5%	78%	14%				
CC_Adop_5	4	0	10	113	20	3.99	0.672	4	
	3%	0%	7%	77%	14%				
CC_Adop_6	4	0	11	120	12	3.93	0.631	6	
	3%	0%	7%	82%	8%				
CC_Adop_7	4	0	10	52	81	4.40	0.841	1	
	3%	0%	7%	35%	55%				
CC_Adop_8	4	4	43	77	19	3.70	0.831	9	
	3%	3%	29%	52%	13%				
CC_Adop_9	2	2	9	119	15	3.97	0.585	5	
	1%	1%	6%	82%	10%				
* Standard Deviations ** Rank									

CC_Adop_1	The organisation was able to reduce the software development time and cost of hardware.
CC_Adop_2	The organisation's performance has improved gradually with better communication with suppliers and customers.
CC_Adop_3	Low upfront investments as well as predictable and scalable operation expenses of CC.
CC_Adop_4	CC increased the ability of the organisation to adopt rapidly and cost efficiently in response to changes in the business environment.
CC_Adop_5	Organisations consider CC as a reliable and secure service than traditional computing.
CC_Adop_6	Using CC services can facilitate organisations to focus on core business activities rather than on IT operations.
CC_Adop_7	Access to services from anywhere and from/across different platforms without putting too much investment prior to the needs.
CC_Adop_8	Employee's performance, satisfaction and loyalty ratings have increased.
CC_Adop_9	The business goals of the organisation have been successfully accomplished.

Table 7.61: CC Adoption Item Statistics

Table 7.61 portrays the mean and standard deviation values for the nine items; it is coherent that respondents from different organisations most frequently rated that using CCT need access to services from anywhere and from/across the various platforms without putting too much investment before needs for the smooth running of CC environment (CC_Adop_7) as the primarily supported variable for the organisation; there are Sec_Prv_2, CC_Adop_4, CC_Adop_5, CC_Adop_9, CC_Adop_6, CC_Adop_1 CC_Adop_3; while CC_Adop_8 is the least supported.

The ‘CC adoption’ show Cronbach’s alpha value of 0.939 which is higher considering the acceptable threshold of 0.7. Scales suggest that users have a high level of internal consistency.

7.11 Results of Hypotheses Examination

In Chapter 5, a structural research model and developed a series of hypotheses to ensure a suitable answer to the research question outlined in Chapter 1. This section evaluated the structural research model and hypotheses by employing statistical analysis. The hypothesised path results of the structural research model are reported in this section to test the hypotheses (Table 7.63).

Size of Correlation	Interpretation
.90 to 1.00 (−.90 to −1.00)	Very high positive (negative) correlation
.70 to .90 (−.70 to −.90)	High positive (negative) correlation
.50 to .70 (−.50 to −.70)	Moderate positive (negative) correlation
.30 to .50 (−.30 to −.50)	Low positive (negative) correlation
.00 to .30 (.00 to −.30)	negligible correlation

Table 7.62: The table above demonstrates how to interpret the size (strength) of a Correlation coefficient, (Zakaria Jaadi, 2019)

Alternative Hypothesis		Paths			Coefficient Correlation	P	Results
H1-1	The provision of external support has a positive impact on adoption of secure CC.	External Support	→	Adopt	**0.321****	**<.001**	Support (Reject the null hypothesis)
H2-1	The existence of competitive pressure has a positive impact on adoption of secure CC.	Competitive Pressure	→	Adopt	**0.089**	**0.283**	No Support
H3-1	Senior Management support has a positive impact on adoption of secure CC.	Senior Management Support	→	Adopt	**0.134**	**0.107**	No Support
H4-1	Employee's knowledge about CC is positively related to the adoption of secure CC.	Employee's Cloud Knowledge	→	Adopt	**0.532****	**<.001**	Support (Reject the null hypothesis)
**H 5-1	Adequate resources are positively related to the	Adequate Resources	→	Adopt	**0.160**	**0.053**	No Support

	adoption of secure CC.						
H6-1	Information intensity is positively related to the adoption of secure CC.	Information Intensity	→	Adopt	**0.423****	**<.001**	Support (Reject the null hypothesis)
H7-1	Relative advantage of using CC is positively related to the adoption of secure CC.	Relative Advantage	→	Adopt	**0.443****	**<.001**	Support (Reject the null hypothesis)
H8-1	The perceived level of complexity of the CC has a negative impact on the adoption of secure CC.	Complexity	→	Adopt	**0.331****	**<.001**	Support (Reject the null hypothesis)
H9-1	Level of CC's compatibility with companies norms and technologies has a positive influence on adoption of secure CC.	Compatibility	→	Adopt	**0.528****	**<.001**	Support (Reject the null hypothesis)

H10-1	Security and privacy has positive impact on adoption of secure CC.	Security and Privacy	→	Adopt	**0.489****	**<.001**	Support (Reject the null hypothesis)
H11-1	Evaluating cost effectiveness has a positive impact on adoption of secure CC.	Evaluate Cost	→	Adopt	**0.503****	**<.001**	Support (Reject the null hypothesis)

**. Correlation is significant at the 0.001 level (2-tailed).

Table 7.63: Output for hypothesised path relationships.

H1-1: The provision of *external support has a positive impact* on adoption of secure CC.

H2-1: The existence of *competitive pressure has a positive impact* on adoption of secure CC.

H3-1: *Senior Management support has a positive impact* on adoption of secure CC.

H4-1: *Employee's knowledge about* CC *is positively related to the* adoption of secure CC.

H5-*1*: *Adequate resources are positively* related to the adoption of secure CC.

H6-1: *Information intensity is positively related to the* adoption of secure CC.

H7-1: *Relative advantage of using* CC *is positively related* to the adoption of secure CC.

H8-1: *The perceived level of complexity of the* CC *has a negative impact* on the adoption of secure CC.

H9-1: *Level of* CC *compatibility with companies' norms and technologies has a positive influence* on adoption of secure CC.

H10-1: *D*ata security and privacy *has positive impact* on adoption of secure CC.

H11-1: Evaluating cost effectiveness *has a positive impact* on adoption of secure CC.

Hypothesis 1: External Support:

Correlations

			CC_Adoption	External_Support
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.321**
		Sig. (2-tailed)	.	<.001
		N	147	147
	External_Support	Correlation Coefficient	.321**	1.000
		Sig. (2-tailed)	<.001	.
		N	147	147

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

Table 7.64: Spearman's correlation coefficient external support.

Spearman's correlation coefficient test results show that external support significantly impacts CC services adoption.

Table 7.64 suggests that there is sufficient statistical evidence at the alpha=0.001 level that the provision of external support positively impacts the adoption of secure CC.

A positive correlation between these two variables, i.e., variable CC adoption output and variable external support, and the correlation coefficient value is .321, which suggests that the result is significant.

Hypothesis 2: Competitive Pressure:

Correlations

			CC_Adoption	Competitive_Pressure
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.089
		Sig. (2-tailed)	.	.283
		N	147	147
	Competitive_Pressure	Correlation Coefficient	.089	1.000
		Sig. (2-tailed)	.283	.
		N	147	147

Table 7.65: Spearman's correlation coefficient competitive pressure.

Spearman's correlation coefficient test results confirmed that competitive pressure demonstrates no significant positive impact on cloud adoption.

Table 7.65 suggests no strong correlation between these two variables, i.e., variable CC adoption and competitive pressure. The p-value is more significant than 0.001, and the correlation coefficient value is .089, which suggests that the result is substantial.

Hypothesis 3: Senior Management Support:

Correlations

			CC_Adoption	Senior_Management_Support
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.134
		Sig. (2-tailed)	.	.107
		N	147	147
	Senior_Management_Support	Correlation Coefficient	.134	1.000
		Sig. (2-tailed)	.107	.
		N	147	147

Table 7.66: Spearman's correlation coefficient senior management support.

Spearman's correlation coefficient test result confirmed that senior management support demonstrates no enormously significant positive impact on cloud adoption.

Table 7.66 suggests no strong correlation between these two variables, i.e., variable CC adoption and senior management support. The p-value is more significant than 0.001, and the correlation coefficient value is .134, which suggests that the result is substantial.

Hypothesis 4: Employees Cloud Knowledge:

Correlations

			CC_Adoption	Employee_Cloud_Knowledge
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.532**
		Sig. (2-tailed)	.	<.001
		N	147	147
	Employee_Cloud_Knowledge	Correlation Coefficient	**.532****	1.000
		Sig. (2-tailed)	<.001	.
		N	147	147

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

Table 7.67: Spearman's correlation coefficient employees cloud knowledge.

Spearman's correlation coefficient test results show that employee cloud knowledge significantly impacts CC adoption.

Table 7.67 suggests that there is sufficient statistical evidence at the alpha=0.001 level that the provision of employee cloud knowledge positively impacts the adoption of secure CC.

A positive correlation between these two variables, i.e., variable CC adoption output and variable employee cloud knowledge, and the correlation coefficient value is .532, which suggests that the result is significant.

Hypothesis 5: Adequate Resources:

Correlations

			CC_Adoption	Adequate_Resources
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.160
		Sig. (2-tailed)	.	.053
		N	147	147
	Adequate_Resources	Correlation Coefficient	.160	1.000
		Sig. (2-tailed)	.053	.
		N	147	147

Table 7.68: Spearman's correlation coefficient adequate resources.

Spearman's correlation coefficient test results confirmed that adequate resources demonstrate no enormously significant positive impact on cloud adoption.

Table 7.68 suggests no strong correlation between these variables, i.e., variable CC adoption and adequate resources. The p-value is more significant than 0.001, and the correlation coefficient value is .160, which suggests that the result is substantial.

Hypothesis 6: Information Intensity:

Correlations

			CC_Adoption	Information_Intensity
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.423**
		Sig. (2-tailed)	.	<.001
		N	147	147
	Information_Intensity	Correlation Coefficient	.423**	1.000
		Sig. (2-tailed)	<.001	.
		N	147	147

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

Table 7.69: Spearman's correlation coefficient information intensity.

Spearman's correlation coefficient test results show that Information Intensity has a significant positive impact on CC adoption.

Table 7.69 suggests that there is sufficient statistical evidence at the alpha=0.001 level that the provision of Information Intensity positively impacts the adoption of secure CC.

A positive correlation between these two variables, i.e., variable CC adoption output and variable Information Intensity, and the correlation coefficient value is .423, which suggests that the result is significant.

Hypothesis 7: Relative Advantage:

Correlations

			CC_Adoption	Relative_Advantage
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.443**
		Sig. (2-tailed)	.	<.001
		N	147	147
	Relative_Advantage	Correlation Coefficient	.443**	1.000
		Sig. (2-tailed)	<.001	.
		N	147	147

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

Table 7.70: Spearman's correlation coefficient.

Spearman's correlation coefficient test results show that relative advantage has a significant positive impact on CC adoption.

Table 7.70 suggests that there is sufficient statistical evidence at the alpha=0.001 level that the provision of relative advantage positively impacts the adoption of secure CC.

A positive correlation between these two variables, i.e., variable CC adoption output and variable relative advantage, and the correlation coefficient value is .443, which suggests that the result is significant.

Hypothesis 8: Complexity:

Correlations

			CC_Adoption	Complexity
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.331**
		Sig. (2-tailed)	.	<.001
		N	147	147
	Complexity	Correlation Coefficient	.331**	1.000
		Sig. (2-tailed)	<.001	.
		N	147	147

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

Table 7.71: Spearman's correlation coefficient.

Spearman's correlation coefficient test results show that complexity has a significant positive impact on CC adoption.

Table 7.71 suggests that there is sufficient statistical evidence at the alpha=0.001 level that the provision of complexity positively impacts the adoption of secure CC.

A positive correlation between these two variables, i.e., variable CC adoption output and variable complexity, and the correlation coefficient value is .331, which suggests that the result is significant.

Hypothesis 9: Compatibility:

Correlations

			CC_Adoption	Compatibility
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.528**
		Sig. (2-tailed)	.	<.001
		N	147	147
	Compatibility	Correlation Coefficient	.528**	1.000
		Sig. (2-tailed)	<.001	.
		N	147	147

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

Table 7.72: Spearman's correlation coefficient.

Spearman's correlation coefficient test results show that compatibility has a significant positive impact on CC adoption.

Table 7.72 suggests that there is sufficient statistical evidence at the alpha=0.001 level that the provision of compatibility positively impacts the adoption of secure CC.

A positive correlation between these two variables, i.e., variable CC adoption output and variable compatibility, and the correlation coefficient value is .528, which suggests that the result is significant.

Hypothesis 10: Security and Privacy:

Correlations

			CC_Adoption	Security_And_Privacy
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.489**
		Sig. (2-tailed)	.	<.001
		N	147	147
	Security_And_Privacy	Correlation Coefficient	.489**	1.000
		Sig. (2-tailed)	<.001	.
		N	147	147

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

Table 7.73: Spearman's correlation coefficient.

Spearman's correlation coefficient test results show that Security and Privacy significantly impact CC adoption.

Table 7.73 suggests that there is sufficient statistical evidence at the alpha=0.001 level that the provision of Security and Privacy positively impacts the adoption of secure CC.

A positive correlation between these two variables, i.e., variable CC adoption output and variable Security and Privacy, and the correlation coefficient value is .489, which suggests that the result is significant.

Hypothesis 11: Evaluating Cost:

Correlations

			CC_Adoption	Evaluating_Cost
Spearman's rho	CC_Adoption	Correlation Coefficient	1.000	.503**
		Sig. (2-tailed)	.	<.001
		N	147	147
	Evaluating_Cost	Correlation Coefficient	.503**	1.000
		Sig. (2-tailed)	<.001	.
		N	147	147

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

Table 7.74: Spearman's correlation coefficient.

Spearman's correlation coefficient test results show that evaluating cost has a significant positive impact on CC adoption.

Table 7.74 suggests that there is sufficient statistical evidence at the alpha=0.001 level that the provision of evaluation cost positively impacts the adoption of secure CC.

A positive correlation between these two variables, i.e., variable CC adoption output and variable evaluate cost, and the correlation coefficient value is .503, which suggests that the result is significant.

7.12 Conclusions

The previous chapter provides an investigation and discussion associated with the critical drivers of CC adoption and the proposed research model factors. This chapter summarises the outcomes of quantitative data analysis. It starts with the results of the descriptive study on the survey respondents' and firms' demographics, followed by the validation of the research mechanism, which includes FA, EFA, and Cronbach alpha for the data collection associated with the research proposed model and a validity and reliability tests, a structure model test and an examination of the hypotheses results.

This chapter represents the conclusions of the structural research model with calculated path coefficient relationships. All hypotheses are inspected and reported; eight out of eleven hypotheses in the projected model significantly impact the intention of CC services adoption. The three hypotheses in the proposed model are found non-significant on the purpose of the qualitative and quantitative analysis performed in chapters 6 & 7, respectively, CC services adoption at the defined significance level. Revised the research goals in the subsequent chapter and represented the academic offerings of the research, demonstration of empirical contributions, and a discussion on the potential limitations and future research.

Chapter 8 - Conclusions and Future work

8.1 Introduction:

The primary objective of this research was to discover, examine, and develop a framework to support secure and cost-effective CC adoption decision-making for SMEs and large enterprises internationally. The research study's results authenticate the research approach adopted to respond to the research aims. This chapter begins with an inclusive summary of the investigation, emphasising the research question, and aims set in Chapter 1. This chapter also debates the theoretical and practical impact of the inquiry on the developing body of knowledge on security and cost-effective CC adoption concentrating on the business sectors internationally. Finally, this chapter accomplishes, by discussing the limitations of the investigation, areas for future investigation in this field.

8.2 Research Summary:

As discussed in chapter 1, CC characterises a pattern of how computing resources like hardware, storage, and servers are bought and kept. The technology revolution reflected by CC with all the required features and abilities to convert computing into a utility for the future day-to-day activities in every sector like financial, medical, engineering, etc. Due to the benefits of secure and cost-effective CC infrastructure, such as less capital investment on the IT infrastructure and highly mountable technologies access, CC can expand IT adoption amongst SMEs and large enterprises.

The prospective technical and economic benefits of adopting CC infrastructure, the level of adoption, is encouraging in SMEs and large enterprises. The SME sector is the backbone of a country's economy, and the SME sector employs more workforce than the total of other sector. The level of IT adoption amongst the SME sector is encouraging, despite issues, such as lack of capital, lack of expertise, and lack of skilled labour. The productive benefits of the CC in IT infrastructure and advanced technology utilisation encourage more SMEs to adopt CC.

Revolutions in IT amongst SMEs and larger enterprises have demonstrated progress in their productivity and effectiveness and permit SMEs to compete with larger enterprises (Pei-Fang et al., 2014). IT revolutions make CC a perfect contestant for SMEs.

From the CC perspective, exploring the issues, challenges, and other critical factors that impact secure and cost-effective CC adoption is necessary. CC remains the primary motivation of this research, which concentrates on SMEs and large enterprises.

SLR in Chapter 2 discovered support from some empirical studies and practical research in the particular field of CC services adoption. Empirical studies have explored factors that impact CC services adoption for different geographical locations and some frameworks to support diverse phases of the CC adoption procedure.

Analysed is a total of 561 research studies and selected 85 research studies from databases, such as ACM Digital Library, IEEE Xplore, Inspec, Springer Link, Google Scholar, Google Books, Researchgate, and Wolverhampton University Online Library, and selected articles with publication types, such as conferences, journals, articles, conceptual papers, research papers, surveys, books, case study, press release, Ph.D. thesis, publications and workshop on CC adoption focused on the SMEs and large enterprise sector.

It has tried to improve the framework for the entire CC adoption procedure. Similarly, there are no empirical studies earlier to explore technology-supported CC guidelines and secure and cost-effective adoption focusing on the SME and large enterprise sector. Therefore, it became necessary to theoretically investigate the guidelines and secure and cost-effective CC adoption by SMEs and large enterprises through the survey to accomplish the research aims.

The research was carried out in phases to explore the factors that impact secure and cost-effective CC services adoption and to develop a framework to support CC services adoption and decision-making. The study's first phase aimed to categorise the elements of CC services adoption for enterprises. The study's second phase aimed to integrate the outcomes of the first phase of the research and develop a framework to support a secure and cost-effective CC services adoption decision-making process, and discussed the SLR fundamentals of this research in Chapter 5.

SLR explored some elements to study technology adoption at the individual and organisation levels. However, research theories developed for enterprises through SLR could only categorise some empirical studies investigating CC services adoption technology. Research developed a conceptual framework incorporating four factors, i.e., environmental, human, organisational, and technological.

However, the framework included eleven respective variables, i.e., external support, competitive pressure, senior management support, employee cloud knowledge, adequate resources, information intensity, relative advantage, complexity, compatibility, security/privacy, and cost-effectiveness for decision-making factors that are significant for enterprises.

The developed hypotheses, established from SLR, were tested to recognise the relationship between factors and their respective variables to secure and adopt cost-effective CC services. For the second phase of the study, I used the investigative technique of decision-making to develop the framework. I discussed the theoretical background of human decision-making in Chapter 5. Discussed the various elements, and a suitable explanation is given for choosing the proposed model to support secure and cost-effective CC adoption decision support.

Research was conducted with a mixed methods approach with a rational research perspective to approach the research problem and discussed the research methodology agreed upon in Chapter 4. The study proceeded in three phases. During the first phase (Investigative phase), semi-structured interviews took place and we conducted a primary survey to classify the perception, possibilities, and obstacles of CC by decision-makers from SMEs and large enterprises. Chapter 5 developed a research model to test; empirical data to be collected by a web-based questionnaire through the survey monkey website and sent questionnaires to IT professionals engaged in traditional IT and CC, middle/executive level management, and decision-makers from SMEs and large enterprises; IBM SPSS version 26 was used to examine the quantitative data.

A questionnaire link was sent to 315 enterprises using CC services, and 158 responses were received, reflecting an initial response rate of 50%. After the data screening process, we reduced valid responses to 147 and decreased to 47%. For the research factors and their respective variables, the study used Cronbach's alpha to determine the reliability of the statistics.

All of the research factors and their respective variables had suitable reliability measures. Factor analysis (FA) was used to confirm validity measures, FA is an effective tool engaged validation of tests, and scales, and this method comprises exploratory factor analysis (EFA). The study used Spearman's coefficient correlation to identify the strength and direction of the research variables. Hypotheses in Chapter 3 tested Spearman's coefficient correlation, nine CC adoption decision variables of four individual factors were found to have a statistically positive impact on guidelines security and cost-effective CC adoption, and rejected three hypotheses as they were not statistically significant.

The study integrated four factors and their eleven respective identified variables. It established a framework based on empirical research to support CC guidelines and secure and cost-effective CC services adoption decision-making procedures. The SLR recognised CC services adoption specific to enterprises from our primary investigation. A case study was employed to test the framework's effectiveness in supporting the CC adoption problem.

8.3 Research contributions:

To the best of our knowledge, this study is the first effort to explore and investigate the adoption guidelines of secure and cost-effective CC services among small, medium, and large enterprise decision-makers. This section discussed this investigation's contribution to the developing body of knowledge on CC services adoption.

8.3.1 Methodological contributions:

This research investigation makes an important methodological influence to present knowledge on secure and cost-effective CC services adoption guidelines. The primary designed research methodology's impact is approaching the research objectives. The research methodology can be amended for small, medium, and large enterprises according to their geographical location. Research helps to explore the technological revolution for developing and developed economies.

8.3.2 Theoretical contributions:

The research influences two significant theoretical contributions. Firstly, this research influences academic assistance by outspreading the present understanding of CC services adoption among small, medium, and large enterprises. Current literature constructs the conceptual framework applied to small, medium, and large enterprises to categorise the factors and respective variables influencing the guidelines for adopting secure and cost-effective CC services infrastructure.

The preliminary investigative phase measured participants as case demonstrative of the small, medium, and large enterprises. The primary survey had no specific cases, and small, medium, and large enterprises from all industries were requested to participate in the research survey. The empirical research recognised eight variables that were statistically significant and had a positive impact on CC services adoption.

The second significant influence is the framework established to support secure and cost-effective CC services adoption decision-making by small, medium, and large enterprises. The SLR discovered a comprehensive framework covering complete guidelines, security/privacy, and the unavailable cost-evaluating process, based on the established framework of the investigation model of the decision-making procedure.

The study accepted this model due to the suitability of the research model to the stages of detailed guidelines in secure and cost-effective CC services adoption. The framework has four factors; environmental, human, organisational, and technological. The two variables influenced by the assessment phase (security/privacy and cost evaluating identification) are distinctive contributions built for small, medium, and large enterprises established on the present frameworks identified from our SLR.

8.3.3 Practical contributions:

This research also has significant practical implications for decision-makers and CSPs. From a CSP's perspective, the empirical research will clearly understand the concerns associated with guidelines and secure and cost-effective CC services adoption for small, medium, and large enterprises. The research outcomes indicated that lack of awareness of the benefits of secure and cost-effective CC services adoption, lack of understanding of the payment models, guidelines, and lack of professional expertise as some of the primary obstructions to the CC guidelines, secure and cost-effective CC services adoption.

Small, medium, and large enterprise decision-makers also emphasised that explicitly designed products and services are unavailable for the CC market. CSPs can select an operative marketing approach to construct awareness of the benefits and guidelines for adopting secure and cost-effective CC services and cloud infrastructure. If CSPs address these concerns, it will positively impact the adoption of secure and cost-effective CC services among small, medium, and large enterprises.

The research also recognised a need for more clarity or understanding of the legal implication of CC services adoption. The government can address this concern by building awareness, policies, and legal frameworks to support CC adoption for small, medium, and large enterprises countrywide.

From a decision-maker viewpoint, the established framework can help the decision-makers make decisions concerning CC services adoption effectively. This study also has practical implications for investigators in the field of CC computing. The earlier two sections discussed improving the methodological and theoretical contributions to the present understanding of secure and cost-effective CC services adoption. Section 7.5 discusses future opportunities for investigation in the guidelines and secure and cost-effective CC services adoption.

8.4 Future Research:

Followed by possibilities of investigation based on the conclusions presented in this thesis:

This thesis developed a framework as a beginning point to assist in developing a CC services adoption for the decision support system. Technical implementation of the framework will automate the CC services adoption decision-making procedure and reduce the decision-makers workload when making decisions concerning CC services adoption.

The second line of investigation arises from the conclusions of the web-based survey. The survey recognised the determinant factors and their respective variables of CC services adoption for small, medium, and large enterprises. The determinants are appropriate for studies concentrating on developing decision support system (DSS)/tools/frameworks for each of the CC service delivery models, such as Infrastructure as a System (IaaS), Platform as a Service (PaaS), or Software as a System (SaaS), etc. With current developments in internet infrastructure, small, medium, and large enterprises have started progressively using cloud services applications accessible by several cloud providers.

Based on the accomplishment of CC-based companies. Innovative small, medium, and large enterprises are adopting various cloud services products to support several regions of their businesses. The survey's conclusions can assist as a beginning point for investigation concentrating on selecting an appropriate cloud service for a small, medium, and large enterprise in a technologically developing area.

.

Finally, to improve investigation by employing a longitudinal design and examining quantitative data collected over a while with a larger sample. As CC services continually develop, a longitudinal investigation strategy will suit the investigation objectively and help procure more results. By employing a longitudinal investigation design, the research can help management investigators recognise the adoption of the CC services revolution from small, medium, and large enterprise perspectives.

References

Wikipedia - Salesform.com, n.d. *Salesform.com, from Wikipedia.* s.l.:s.n.

Ab R D, & Dr. D. Ravindran., 2018. *A Comprehensive Study On Cloud Computing.* s.l., s.n.

Abdullah, 2016. *A Knowledge Management Based Cloud Computing Adoption Decision Making Framework.* s.l.:s.n.

Abhijit Dubey, and Dilip Wagle, 2007. Delivering software as a service. *The McKinsey Quarterly: The Online Journal of McKinsey & Co..*

Abokhodair, N., Taylor, H., Hasegawa, J., & Mowery, S.J, 2012. *"Heading for the Cloud?" Implications for Cloud Computing Adopters.* s.l., s.n.

Alain et al., 2009. Factors Affecting The Adoption Level of C-Commerce: an Empirical Study. *Journal of Computer Information Systems,* 7 January.

Alessandro F, & Giorgio P, 2007. Statistical Methods for Monitoring Data Analysis. *Geotechnical Special Publication,* September.

Ali K-H, et.al, 2010. Research Challenges for Enterprise Cloud Computing. *Submitted to the 1st ACM Symposium on Cloud Computing, SOCC,* 18 January.

Ali, 2010. The Cloud Adoption Toolkit: Supporting Cloud Adoption Decisions in the Enterprise. 11 August.

Amandeep V, et.al, 2011. *Cloud Computing Security Issues and Challenges.* s.l., s.n.

Amazon, 2019. *Amazon.com: Annoiunces Thrirds Quarter Sales up 24% to $70.0 Billion ,* N/A: Amazon.

Ana, Brian and Estela, 2015. *Critical Approaches to the Study of Higher Education: A Practical Introduction.* s.l.:s.n.

Ana, Brian, and Estela, 2015. *Critical Approaches to the Study of Higher Education: A Practical Introduction.* s.l.:s.n.

Anabel and Lumsden, 2014. Key Management Determinants for Cloud Computing Adoption. *Association for Information Systems AIS Electronic Library (AISeL). UK Academy for Information Systems Conference. Proceedings 2014 UK Academy for Information..*

Anabel, Elias and Ranald, 2015. Technological, organisational and environmental factors influencing managers' decision to adopt cloud computing in the UK. *Journal of Enterprise Information Management,* October.28(6).

Andrew and Howard, 2016. *A First Course in Factor Analysis.* Second Editkion ed. s.l.:s.n.

Angela and Nan-Chou, 2012. Cloud Computing as an Innovation: Percepetion, Attitude, and Adoption. *International Journal of Information Management,* December, 32(6), p. 533–540.

Angela, and Nan-Chou, 2012. Cloud Computing as an Innovation: Percepetion, Attitude, and Adoption. *International Journal of Information Management,* December, 32(6), p. 533–540.

Ann, 2005. Mode of Questionnaire Administration Can Have Serious Effects on Data Quality. *Journal of Public Health,* September, 27(3), p. 281–291.

Anon., 2020. *History of Cloud Computing Timeline.* s.l.:s.n.

Arnab, Guo and Alok, 2013. Risks in Enterprise Cloud Computing: the Perspective of IT Experts. *Journal of Computer Information System,* December, 53(4), pp. 39-48.

Ashwini et al., 2012. *Decision Points for Adoption Cloud Computing in Small, Medium Enterprises (SMEs).* s.l., s.n.

Barbara and Linda, 2018. *Using multivariate statistics (International).* s.l.:Pearson Education..

Barbara et al., 2007. *Guidelines for performing Systematic Literature Reviews in Software Engineering.* s.l.:s.n.

Baun, et.al, 2011. Cloud Computing: Web Based Dynamic IT Services. In: *Cloud Computing: Web Based Dynamic IT Services.* s.l.:Publisher: Springer.

Ben, Delroy and Densil, 2013. SMEs' adoption of enterprise applications A technology-organisation-environment model. *Journal of Small Business and Enterprise Development,* 20(4), pp. 735-753.

Benedikt M, et.al, 2012. *Costing of Cloud Computing Services: A Total Cost of Ownership Approach.* s.l., s.n., pp. 1563-1572.

Bernard, 2006. *Research Methods in Anthropology, Qualitative and Quantitative Approaches.* Fourth Edition ed. s.l.:AltaMira Press.

Borko F, & Armando E, 2010. Handbook of Cloud Computing. In: s.l.:Springer.

Boumediene and Peter, 2007. SME Adoption of Enterprise Systems In The Northwest of England: An Environmental, Technological, and Organizational Perspective. *In (IFIP) International Federation for Information Processing, Volume 235, pp. 409,* Volume 235, pp. 409-430.

Boumediene, Peter and Oswaldo, 2009. Predicting SMEs' Adoption of Enterprise Systems. *Journal of enterprise information management,* 13 February.

Brett, Andrys and Ted, 2012. Journal: Exploratory Factor Analysis: A Five-Step Guide for Novices. *Australasian Journal of Paramedicine,* 8(3).

Brian and B.Donnellan, 2013. *FACTORS THAT AFFECT THE ADOPTION OF CLOUD COMPUTING FOR AN ENTERPRISE: A CASE STUDY OF CLOUD ADOPTION IN INTEL CORP..* s.l., Association for Information Systems AIS Electronic Library (AISeL).

Brian, and B.Donnellan, 2013. *FACTORS THAT AFFECT THE ADOPTION OF CLOUD COMPUTING FOR AN ENTERPRISE: A CASE STUDY OF CLOUD ADOPTION IN INTEL CORP..* s.l., Association for Information Systems AIS Electronic Library (AISeL).

Bryman, A, 2006. Integrating quantitative and qualitative research: How is it done?. *Qualitative Research,* 6(1), pp. 97-113.

Bupesh M, et.al, 2011. *An Empirical Study Of Challenges In Managing The Security In Cloud Computing.* s.l., s.n.

C.Lakshmi, 2014. *Impact Study Of Cloud Computing On Business Development.* s.l., s.n.

Cameron C, 2015. *9 Cloud Computing Security Risks Every Company Faces, and What Proactive Steps You Can Take to Protect Your Data,* s.l.: s.n.

Carol, Albert and Michael, 2012. Determining safety climate factors in the repair, maintenance, minor alteration, and addition sector of Hong Kong.

Carol, Albert, and Michael, 2012. Determining safety climate factors in the repair, maintenance, minor alteration, and addition sector of Hong Kong.

Cegielski et al., 2012. Adoption of cloud computing technologies in supply chains: An organizational information processing theory approach. *The International Journal of Logistics Management,,* 10 August, 23(2), pp. 184-211.

Cheng and Jasbir, 2009. An Investigation of ResourceBbased and Institutional Theoretic Factors in Technology Adoption for Operations and Supply Chain Management.. *International Journal of Production Economics (INT J PROD ECON).,* July, 120(1), pp. :252-269.

Chitu and Kira, 2010. A Guide to Conducting a Systematic Literature Review of Information Systems Research. *SSRN Electronic Journal,* May.Volume 10.

Chitu and Kira, 2010. A Guide to Conducting a Systematic Literature Review of Information Systems Research. *SSRN Electronic Journal,* May.Volume 10.

Chitu, and Kira, 2010. A Guide to Conducting a Systematic Literature Review of Information Systems Research. *SSRN Electronic Journal,* May.Volume 10.

Chiu et al., 2007. Factors affecting the adoption of electronic signature: Executives' perspective of hospital information department. *Decision Support Systems,* 44(1), pp. 350-359.

Christine, 2008. *Implementing a Forensic Educational Package for Registered Nurses in Two Emergency Departments in Western Australia.* s.l.:s.n.

Chuck Lance, et.al, 2006. The Sources of Four Commonly Reported Cutoff Criteria: What Did They Really Say?. *Organizational Research Methods,* April, 9(2), pp. 202-220.

Claude et al., 2017. *Interoperability and Portability for Cloud Computing: A Guide Version 2.0.* s.l.:s.n.

Colin and Felicia, 2016. Benefits and Challenges Of The Adoption of Cloud Computing In Business. *International Journal on Cloud Ccomputing: Services and Architecture (IJCCSA),* December.6(6).

Constantinos, Wietske and Jieun, 2013. *A "cloud lifestyle": The diffusion of Cloud Computing Applications and the ffect of Demographic and Lifestyle Clusters.* Hawaii, USA, s.n.

Creswell and Clark, 2018. *Designing and conducting mixed methods research..* 2nd ed. s.l.:Sage Publications..

Creswell, and Clark, 2018. *Designing and conducting mixed methods research..* 2nd ed. s.l.:Sage Publications..

Creswell, 2014. *Research design: Qualitative, quantitative, and mixed methods approaches.* 4th edition ed. s.l.:SAGE Publications, Inc..

Dalsang and Sun, 2014. Adoption nd Implementation Of Cloud Computing Services: A Railroad Company Case. *Issues in Information Systems,* 15(II), pp. 276-284.

Danish J, & Hassan Z, 2011. Security Issues In Cloud Computing and Countermeasures. *International Journal of Engineering Science and Technology (IJEST),* April, 3(4), pp. 2672-2676.

Delvis Simmonds, et.al, 2012. *Public Cloud Computing vs. Private Cloud Computing: How Security Matters.* s.l.:s.n.

Dimitrios and Dimitrios, 2012. Addressing Cloud Computing security issues. March, 28(3), pp. 583-592.

Douglas, 2010. *THE CLOUD DIVIDEND: Part One. The Economic Benefits Of CC To Business And The Wider EMEA economy.* s.l.:s.n.

Easwar et al., 2013. *Analysis of Dissatisfiers That Inhibit Cloud Computing Adoption Across Multiple Customer Segments.* s.l., Academic Conferences and Publishing International Limited.

EC relevance, 2003. Commission Recommendation: concerning the definition of micro, small and medium-sized enterprises. *Official Journal of the European Union,* 0(0), p. 1422.

Elom W, & Prof. Raj J, 2015. *A Survey of CC Security: Issues, Challenges and Solutions,* s.l.: s.n.

Eric A. Marks and Bob Lozano, 2010. *Executive's Guide to Cloud Computing.* N/A ed. New Jersey, USA: John Wiley & Sons, Inc., Hoboken, New Jersey.

Espadanal and Oliveira, 2012. *Cloud Computing Adoption by Firms.* s.l., Association for Information Systems Electronic Library (AISeL).

Espadanal, and Oliveira, 2012. *Cloud Computing Adoption by Firms.* s.l., Association for Information Systems Electronic Library (AISeL).

Evangelia, Persefoni and Christos, 2014. *SMEs In The Cloud: The Impact Of Cloud Adoption On Economic Growth And Development.* s.l., s.n.

Evangelia, Persefoni and Christos, 2014. *SMEs In The Cloud: The Impact Of Cloud Adoption On Economic Growth And Development.* s.l., s.n.

Everett, 2003. *Diffusion of Innovations.* 5th edition ed. s.l.:s.n.

Eze, S. C., 2013. *Understanding Dynamic Process of Emerging ICT Adoption in UK Service SMEs: An Actor-Network Approach,* UK: s.n.

Fang Liu, Jin Tong, Jian Mao, Robert Bohn, John Messina, Lee Badger, and Dawn Leaf, 2011. *National Institute of Standards and Technology (NIST), Definition of CC. Recommendations of the National Institute of Standards and Technology..* s.l.:s.n.

Federico, 2009. *The Economic Impact of Cloud Computing on Business Creation, Employment and Output in Europe.* s.l.:RePEc.

Gartner-1, 2019. *Public Cloud Soaring To $331B By 2022 According To Gartner,* N/A: Gartner.

Gartner, 2019. *Gartner Forecasts Worldwide Public Cloud Revenue to Grow 17.5 Percent in 2019,* N/A: Gartner.

Gartner-2, 2018. *Gartner Forecasts Worldwide Public Cloud Revenue to Grow 17.3 Percent in 2019,* s.l.: Gartner.

George, Ioana and Adriana, 20015. *How reliable are measurement scales? External factors with indirect influence on reliability estimators.* s.l., Procedia Economics and Finance (ELSEVIER), p. 679 – 686.

Gerard and Edward, 2012. *Managing Cloud Computing: A Life Cycle Approach.* s.l., s.n.

Ghosh and Parvesh, 2010. *A Dictionary of Research Methods.* s.l.:s.n.

Ghosh and Parvesh, 2010. *A Dictionary of Research Methods.* s.l.:s.n.

Gianmario et al., 2014. Service Level Management (SLM) in Cloud Computing Third party SLM framework. *N/A,* N/A(N/A), p. N/A.

Govt. of Australia, 2011. *CLOUD COMPUTING STRATEGIC DIRECTION: By ustralian Goverrntment Department of Finanace and Deregulation (Opportunities and applicability for use by the Australian Government).* Asutra.lia: Government of Australia.

Gregor, Marcus and Axel, 2018. *Cloud Computing in SMEs: A Qualitative Approach to Identify and Evaluate Influential Factors.* s.l., Proceedings of the 51st Hawaii International Conference on System Sciences.

Haibo and Mary, 2012. A Descriptive Literature Review and Classification of Cloud Computing Research. *Communications of the Association for Information System,* July, 31(2), pp. 35-60.

Haibo, and Mary, 2012. A Descriptive Literature Review and Classification of Cloud Computing Research. *Communications of the Association for Information System,* July, 31(2), pp. 35-60.

Hamed, 2016. Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *Journal of Academic Research in Management (IJARM),* January, 5(3), pp. 28-36.

Hans et al., 2013. *Cloudrise: Exploring Cloud Computing Adoption and Governance With the TOE Framework.* s.l., s.n., pp. 1530-1605.

Hasan, 2011. *Adoption of Cloud Computing in Organizations.* Florida, Association for Information Systems AIS Electronic Library (AISeL).

Haslinda and Mohd, 2017. Determinants of Cloud Computing Adoption At Firm Level: From The Technological Context. *Journal of Engineering and Applied Sciences,* September.

Haslinda and Mohd, 2017. Determoines of CC Adoption at Firm Level: From the Technological Context. *Journal of Engineering and Applied Sciences,* 12(16), pp. 4186-4192.

Haslinda H, et.al, 2017. Factors Influencing Cloud Computing Adoption In Small and Medium Enterprises. June, 16(1), pp. 21-41.

Haslinda, and Mohd, 2017. Determinants of Cloud Computing Adoption At Firm Level: From The Technological Context. *Journal of Engineering and Applied Sciences,* September.

Hassan, H., 2017. *Organisational factors affecting cloud computing adoption in small and medium enterprises (SMEs) in service sector.* Barcelona, Spain, s.n., pp. 976-981.

Hemlata et al., 2014. Review on IT Adoption: Insights From Recent Technologies. *Journal of Enterprise Information Management,* July, 27(4), pp. 488-502.

Himmel, M.A, et.al, 2014. Security on distributed systems: Cloud security versus traditional IT. *IBM Journal of Research and Development,* 58(1), p. 3:1–3:13..

Hosted by: Chris K., 2018. *AWS User Group Birmingham, West Midlands.* s.l.:s.n.

Hsiu-Fen and Gwo-Guang, 2005. Impact of Organizational Learning and Knowledge Management Factors on E-Business Adoption. *Management Decision, Volume 43, Issue 2, pg . DOI: . February 2005.,* February, 43(2), pp. 171-188.

Hsiu-Fen and Szu-Mei, 2008. Determinants of E-Business Diffusion: A Test of the Technology Diffusion Perspective. *Science Direct,* Volume 28, pp. 135-145.

Hubert and Thomas, 1989. Technology Diffusion: An Empirical Test of Competitive Effects. *The Journal of Marketing,* January, 53(1), pp. 35-49.

Hui, 2010. Privacy-Preserving Data Sharing in Cloud Computing. *Journal of Computer Science and Technology,* Volume 25, pp. 401-414.

Hui-Min Lai & I-Chun Lin & Ling-Tzu Tseng., 2014. High-Level Managers' Considerations for RFID Adoption in Hospitals: An Empirical Study in Taiwan. *Journal of Medical Systems,* 21 January.38(2).

Ishan et al., 2018. Factors That Influence Adoption of Cloud Computing: An Empirical Study of Australian SMEs. *Australasian Journal of Information Systems,* June.Volume 22.

James, 2012. Exploring the Philosophical Underpinnings of Research: Relating Ontology and Epistemology to the Methodology and Methods of the Scientific, Interpretive, and Critical Research Paradigms. July.5(9).

James, 2020. *Understanding Cloud Services: What is cloud computing?.* [Online]
Available at: https://www.businesstechweekly.com/operational-efficiency/cloud-computing/what-is-cloud-computing-what-is-the-cloud/

Jan et al., 2009. *RECONSTRUCTING THE GIANT: ON THE IMPORTANCE OF RIGOUR IN DOCUMENTING THE LITERATURE SEARCH PROCESS.* Verona, Italy, s.n., p. 161.

Jane and Richard, 2002. ANALYZING THE PAST TO PREPARE FOR THE FUTURE: WRITING A LITERATURE REVIEW. *MIS Quarterly,* June, 26(2), pp. xiii-xxiii.

Jane, and Richard, 2002. ANALYZING THE PAST TO PREPARE FOR THE FUTURE: WRITING A LITERATURE REVIEW. *MIS Quarterly,* June, 26(2), pp. xiii-xxiii.

Jatinder et al., 2015. Data Flow Management and Compliance in Cloud Computing.

Jaydip , 2013. Security and Privacy Issues in Cloud Computing. September.

Jerry A, Alan B, Dave C, Paul K, Nils P & Jim R, 2009. *Security Guidance for Critical Areas of Focus in CC V2.1.* s.l.:Prepared by the Cloud Security Alliance.

Jerry, 2007. *Foundations of Qualitative Research: Interpretive and Critical Approaches.* First ed. s.l.:London: Sage Publications. Inc..

Jiunn-Woei, David and Yen-Ting, 2014. An Exploratory Study To Understand The Critical Factors Affecting The Decision To Adopt Cloud Computing In Taiwan Hospital. *International Journal of Information Management,* February, 34(1), pp. 28-36.

Joe, 1995. The Current State of Marketing Education: New Perspectives. Marketing Education.

Joel and Anil, 2005. The Value of Online Surveys. *Research Gate,* April.15(2).

Joep and Martijn, 2007. Privacy Regulations for Cloud Computing Compliance and Implementation in Theory and Practice. 25 June.

John W R, et.al, 2010. *Cloud Computing Implementation, management and Security.* s.l.:CRC Press Taylor & Francis Group.

John W. Creswell, 2002. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* s.l.:s.n.

Joost, Elfi and Celeste, 2013. Using Grounded Theory as a Method for Rigorously Reviewing Literature. *European Journal of Information Systems (EUR J INFORM SYST),* November, 22(1), p. 45-55.

Joost, Elfi, and Celeste, 2013. Using Grounded Theory as a Method for Rigorously Reviewing Literature. *European Journal of Information Systems (EUR J INFORM SYST),* November, 22(1), p. 45-55.

Jordi et al., 2007. An Integrated Model of the Adoption and Extent of E-Commerce in Firms. *International Advances in Economic Research,* May, 13(2), pp. 222-241.

Joseph et al., 2010. *Multivariate Data Analysis.* s.l.:s.n.

Joseph et al., 2010. *Multivariate Data Analysis.* Seventh Edition ed. s.l.:Pearson Prentice Hall.

Joseph et al., 2014. *Multivariate Data Analysis.* Seventh Edition ed. s.l.:Pearson Education Limited.

Julie, 2015. Understanding and Evaluating Survey Research. 6(2).

Julie, 2020. *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS.* s.l.:s.n.

Jun and Mohammed, 2013. *Information Systems Operation Management.* s.l.:s.n.

Jungwoo, 2004. Discriminant Analysis of Technology Adoption Behavior: A Case of Internet Technologies in Small Businesses. *Journal of Computer Information Systems,* 44(4), pp. 57-66.

Jyoti and Yogesh, 2005. Investigating the Research Approaches for Examining Technology Adoption Issues. *ResearchGate.*

Jyoti, 2013. *Adoption of cloud computing by SMEs in India: A study of the institutional factors.* s.l., s.n.

Kaiser, 1974. An Index of Factorial Simplicity. *PSYCHOMETRIKA,* 39(1).

Kamal et al., 2016. Adoption of Cloud Computing among Enterprises in Malaysia. *Journal of Science and Technology,* December.9(48).

Kanika, Wasana and Gable, 2016. *An Understanding of Business Process Standardization.* s.l., s.n.

Kanika, Wasana, and Gable, 2016. *An Understanding of Business Process Standardization.* s.l., s.n.

Karen and Stephen, 2010. *Data Analysis with SPSS: A First Course in Applied Statistic.* 4th ed. N/A: Pearson.

Karlis, Darya and Tatjana, 2018. Challenge of Cloud Computing for SMEs: A Case of Baltic Countries. *Journal of Innovation Management in Small & Medium Enterprises,* 19 June, 2018(N/A), p. 10.

Karlis, Darya and Tatjana, 2018. Challenge of Cloud Computing for SMEs: A Case of Baltic Countries. *Journal of Innovation Management in Small & Medium Enterprises,* 19 June, 2018(N/A), p. 10.

Kate et al., 2003. Good Practice In The Conduct And Reporting Of Survey Research. *International Journal for Quality in Health Care,* May, 15(3), p. 261–266.

Kate et al., 2003. Good Practice In The Conduct And Reporting Of Survey Research. *International Journal for Quality in Health Care,* May, 15(3), p. 261–266.

Keith D, Foote, 2017. *A Brief History of Cloud Computing,* s.l.: s.n.

Keith F Punch, 2014. *Introduction to Social Research: Quantitative and Qualitative Approaches.* Third Edition ed. s.l.:Sage Publications Ltd.

Keith, 2009. *Introduction to research methods in education.* s.l.:Sage Publications, London.

Kenji E. K, et.al, 2010. *CUTTING THROUGH THE FOG: UNDERSTANDING THE COMPETITIVE DYNAMICS IN CLOUD COMPUTING.* N/A: The Berkeley Roundtable on the International Economy (BRIE).

Kenji E. Kushida, Jonathan Murray, and John Zysman, 2011. *Springerlink.com,* 3 June.

Khan, S, Zhang, B, Khan, F, & Chen, S, 2011. *A case of Pakistan," CC and Intelligence Systems (CCIS).* N/A, IEEE International Conference on Business intelligence in the cloud., pp. 536-540.

Khater, N. R. A., 2017. *A model of a Private Sector Organisation's Intention to Adopt Cloud Computing in the Kingdom of Saudi Arabia,* SOUTHAMPTON: UNIVERSITY OF SOUTHAMPTON, UK.

Khong, Uchenna and Siong, 2012. Effects of Industry Type on ICT Adoption among Malaysian SMEs. *Journal of Supply Chain and Customer Relationship Management,* 2012(0), p. 12.

Khong, Uchenna, and Siong, 2012. Effects of Industry Type on ICT Adoption among Malaysian SMEs. *Journal of Supply Chain and Customer Relationship Management,* 2012(0), p. 12.

Kothari, 2004. *Research methodology: Methods and techniques.* Second Revised Edition ed. s.l.:New Age International (P) Ltd., Publishers.

Kothari, 2004. *Research methodology: Methods and techniques.* Second Revised Edition ed. s.l.:New Age International (P) Ltd., Publishers.

Kristina and Andreja, 2017. *The Importance of Business Model Factors for Cloud Computing Adoption: Role of Previous Experiences,* Slovenia: Organizacija.

Kristina, and Andreja, 2017. *The Importance of Business Model Factors for Cloud Computing Adoption: Role of Previous Experiences,* Slovenia: Organizacija.

Kristine, Constance and Karen, 2005. The Quality of Factor Solutions in Exploratory Factor Analysis: The Influence of Sample Size, Communality, and Overdetermination. 1 April.

Kwon and Robert, 1987. Unifying the fragmented models of information systems implementation. *Critical issues in information systems research. New York:,* pp. 227-251.

Lalit D, et.al, 2016. Cloud Computing And Security Issues In Cloud. *International Journal Of Research In Computer Applications And Robotics,* May, 4(5), pp. 6-13.

Liping Zhao, Liang-Jie Zhang, and Tina X. O. Liu, 2014. RESEARCH GAPS AND TRENDS IN CLOUD COMPUTING: A SYSTEMATIC MAPPING STUDY. *International Journal of Cloud Computing,* October - December, 2(4), p. 0.

Lois and Valerie, 2007. Systematic planning for using an online survey. *ERIC,* September.5(115).

Luoma and Nyberg, 2011. *Four Scenarios for Adoption of Cloud Computing in China..* s.l., AIS (Association for Information Systems) Electronic Library (AISeL).

Luoma, E, et.al, 2011. *Four Scenarios for Adoption of Cloud Computing in China..* s.l., AIS (Association for Information Systems) Electronic Library (AISeL).

Lyn and Harry, 2001. Blanket" approaches to promoting ICT in small firms: some lessons from the DTI ladder adoption model in the UK - draft. *Internet Research,* 11(5), pp. 399-410.

Lyn and Harry, 2001. Blanket" approaches to promoting ICT in small firms: some lessons from the DTI ladder adoption model in the UK - draft. *Internet Research,* 11(5), pp. 399-410.

Magne and Kjetil, 2006. *How Large Are Software Cost Overruns? A Review of the 1994 CHAOS Report,* N/A, Norway: N/A.

Majid, Elhadj and Khawar, 2018. *Key Issues for Embracing the Clloud Computing to Adopt a Digital Transformation: A study of Saudi Public Sector.* s.l., Procedia Computer Science.

Manuel, Jan and Daniel, 2019. How to succeed with Cloud Services? A Dedication-Constraint Model of Cloud Success.. *Springer,* October, 61(2), p. pages181–194 .

Margaret and Trisha, 2012. *Exploring Organizational Adoption of Cloud Computing in Singapore.* s.l., s.n.

Marian, Eileen and Gerard, 2012. *Understanding and Supporting Cloud Computing Adoption in Irish Small- and Medium-Sized Enterprises.* N/A: Innovation Value Institute.

Marian, Eileen, and Gerard, 2012. *Understanding and Supporting Cloud Computing Adoption in Irish Small- and Medium-Sized Enterprises.* N/A: Innovation Value Institute.

Mariana, Alta and Paula, 2011. *Secure Cloud Computing Benefits, Risks and Controls.* s.l., s.n.

Maricela, 2014. *Advantages and Challenges of Adopting Cloud Computing from an Enterprise Perspective.* s.l., Procedia Technology, p. 529 – 534.

Mark et al., 2014. *Impacts On The Organizational Adoption Of Cloud Computing: A Reconceptualization Of Influencing Factors.* s.l., ELSEVEIR.

Mark et al., 2018. Factors Influencing The Organizational Adoption Of Cloud Computing: A Survey Among Cloud Workers. *International Journal of Information Systems and Project Management,* 6(1), pp. 5-23.

Mark, Elena and Marjorie, 2004. Constructing Contributions to Organizational Learning: Argyris and the Next Generation. *SAGE Journals,* 1 Decvember.

Mark, 2009. *Research Methods for Business Students.* 5th edition ed. s.l.:Pearson Education.

Markus Böhm, Stefanie Leimeister, Christoph Riedl, and Helmut Krcmar, 2011. Cloud Computing and Computing Evolution. *IEEE Xplore,* January.

Marry et al., 2018. A Review on Cloud Computing Security. *International Journal On Informatics Visualization,* 2(4).

Mathews and Duy, 2013. *Contributing Factors of Cloud Computing Adoption: a Technology-Organisation-Environment Framework Approach.* s.l., s.n., p. 180–189.

Mathews, and Duy, 2013. *Contributing Factors of Cloud Computing Adoption: a Technology-Organisation-Environment Framework Approach.* s.l., s.n., p. 180–189.

Maurice B, 2013. A Comparison between Centralized and Distributed Cloud Storage Data-Center Topologies. 24 June.

Meiko et al., 2011. *Security Prospects through Cloud Computing by Adopting Multiple Clouds.* s.l., IEEE Xplore.

Meiko J, & Jorg S, 2009. *On Technical Security Issues in Cloud Computing.* s.l., s.n., pp. 109-116.

Michael and David, 2002. *Qualitative Research in Information Systems.* s.l.:s.n.

Michael et al., 2009. Contemporary trends and issues in IT adoption and diffusion research. *Journal of Information Technology,* N/A(N/A), p. N/A.

Michael, and David, 2002. *Qualitative Research in Information Systems.* s.l.:s.n.

Michael, 2014. *Architectecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS and IaaS).* s.l.:John Wiley & Sons, Inc., Hoboken, New Jersey.

Ming-Ju and Woan-Yuh, 2008. Determinants of the Adoption of Enterprise Resource Planning within the Technology-Organization-Environment Framework: Taiwan's Communications Industry. *Journal of Computer Information System,* 48(3).

Mohamed and Volodymyr, 2016. An Overview of Research Methodology in Information System (IS). 3(11).

Mohamed, and Volodymyr, 2016. An Overview of Research Methodology in Information System (IS). 3(11).

Mohammed et al., 2019. Why Adopting Cloud Is Still a Challenge?—A Review on Issues and Challenges for Cloud Migration in Organizations. *Springer.*

Mohammed, 2018. Factors Influencing Cloud Computing Adoption in Saudi Arabia’s Private and Public Organizations: A Qualitative Evaluation. *(IJACSA) International Journal of Advanced Computer Science and Applications,* 9(4).

Mohd, Roslina and Suriayati, 2017. *A Review on Cloud Computing Acceptance Factors.* Bali: ELSEVIER: 4th Information Systems International Conference 2017, ISICO 2017, 6-8 November 2017, Bali, Indonesia .

Monjur A, & Mohammad A H, 2014. Cloud Computing and Security Issues In The Cloud. *International Journal of Network Security & Its Applications (IJNSA),* January, 6(1), pp. 25-36.

Morgan, 2013. *Factors Affecting The Adoption of Cloud Computing: An Exploratory Study.* s.l., s.n., p. 1–13.

Nabeel and Adil, 2016. Identifying Cloud Security Threats to Strengthen Cloud Computing Adoption Framework. *ELSEVIER - The 2nd International Workshop on Internet of Thing: Networking Applications and Technologies,* p. 485 – 490.

Nabeel, 2005. An Empirical Investigation of an e-commerce Adoption-Capability Model in Small Businesses in New Zealand. *Electronic Markets,* 15(4).

Nabil S, 2014. The Journal for Information Professionals. *International Journal of Information Management,* April, 34(2), pp. 177-184.

NASDAQ: AMAZON, 2021. *Amazon.com Announces Financial Results and CEO Transition,* N/A: Amazon.

Nigel, Nick and Amanda, 2009. *Surveys and Questionnaires,* s.l.: s.n.

Nir K, 2010. *Cloud Computing In Developing Economics.* 10 ed. s.l.:IEEE Computer.

Noman I, & Aqeel-Ur-R, 2013. *A comparative study of major service providers for Cloud Computing.* s.l., s.n.

Nouf et al., 2014. *Factors Influencing an Organisation's Intention to Adopt Cloud Computing in Saudi Arabia.* s.l., s.n., pp. 1040-1044.

Omar Ali, e., 2020. *Cloud computing technology adoption: an evaluation of key factors in local governments,* https://www.researchgate.net/publication/340970278_Cloud_computing_technology_adoption_an_evaluation_of_key_factors_in_local_governments: s.n.

Omar et al., 2018. Challenges of Cloud Computing Adoption From the TOE Framework Perspective. *International Journal of E-Business Research,* 14(3), pp. 77-94.

Omar et al., 2020. *Cloud computing technology adoption: an evaluation of key factors in local governments,* s.l.: s.n.

Omondi et al., 2015. The Influence Of Information Security On The Adoption Of Cloiud Computing: An Exploratory Analysis. *International Journal of Computer Networks & Communications (IJCNC),* July.7(4).

Omondi John Opala, and Syed M. Rahman, 2013. *An Exploratory Analysis of the Influence of Information Security on the Adoption of Cloud Computing.* s.l., IEEE Xplore, p. 165–170.

Pan and Jang, 2008. Determinants of The Adoption of Enterprise Resource Planning Within The Technology-Organization-Environment Framework: Taiwan's Communications Industry. *Journal of Computer Information Systems,* 48(3), pp. 94-102.

Pan, J.-S., Snasel, V., Corchado, E.S., Abraham, A., & Wang, S.-L. (Eds.), 2014. *Intelligent Data analysis and its Applications.* s.l.:Proceeding of the First Euro-China Conference on Intelligent Data Analysis and Applications.

Patrick Y.K. Chau, & Kai Lung Hui, 2001. Determinants of Small Business EDI Adoption: An Empirical Investigation. *Journal Of Organizational Computing And Electronic Commerce,* 11(4), p. 229–252.

Paul D L, et.al, 2004. *Practical Research: Planning and Design.* 8th Edition ed. s.l.:Pearson.

Pauline W W, & Christopher A M, 2016. *Cloud Computing: Transforming Medium and High Tech Industries in Kenya.* s.l., s.n.

Pauly et al., 2011. *T-Systems Cloud-Based Solutions for Business Applications," CC: Principles and Paradigms.* 0 ed. USA(NJ): John Wiley & Sons, Inc., Hoboken, NJ.

Pei-Fang et al., 2014. Examining Cloud Computing adoption intention, pricing mechanism, and deployment model. *International Journal of Information Management,* August, 34(4), pp. 474-488.

Pervez and Kjell, 2010. *Research Methods in Business Studies.* Fourth ed. s.l.:s.n.

Pervez, and Kjell, 2010. *Research Methods in Business Studies.* Fourth ed. s.l.:s.n.

Peter et al., 2011. *NIST Cloud Computing Security Reference Architecture.* s.l.:NIST - National Institute of Standards and Technology, NIST Special Publication 500-299.

Phaphoom, N., Wang, X., Samuel, S., Helmer, S. & Abrahamsson, P., 2015. A Survey Study on Major Technical Barriers Affecting the Decision to Adopt Cloud Services. *Journal of Systems and Software,* Volume 103, p. 167–181.

Phyllis, 2007. *Management Research Methods.* s.l.:Cambridge University Press.

Plomp, Batenburg and Hertog, 2014. ICT policy to foster interorganisational ICT adoption by SMEs: The Netherlands Goes Digital case. *Information Systems for Small and Medium-Sized Enterprises.*

Pramod, Anil and Srinivasa , 2013. *Limitations and Challenges in Cloud-based Applications Development.* s.l.:s.n.

Prashant, Seetharaman and John, 2013. The Usage And Adoption of Cloud Computing By Small And Medium Businesses. *International Journal of Information Management,* 17 August, 33(5), p. 861–874.

Prashant, Seetharaman, and John, 2013. The Usage And Adoption of Cloud Computing By Small And Medium Businesses. *International Journal of Information Management,* 17 August, 33(5), p. 861–874.

Praveena D, & Rangarajan, 2014. Analysis of Trend, Service and Deployment Models in Cloud Computing with Focus on Hybrid Cloud and its Implementation. *Research Journal of Applied Sciences,* 9(4), p. 181–186.

Premkumar and Margaret, 1999. Adoption of new information technologies in rural small businesses. 27(4), pp. 467-484.

Primavera De Filippi, and Smari McCarthy, 2012. Cloud Computing: Centralization and Data Sovereignty. *European Journal for Law and Technology,* 3(2).

Primus, 2011. Cloud Computing For SMEs: Bandwagon Or Good Business Strategy?. *Magento Commerce - Primus,* 0(0), p. 0.

Priscilla, 2005. *Fundamentals of Survey Research Methodology,* s.l.: s.n.

Qusay Kanaan Kadhim, Robiah Yusof, Hamid Sadeq Mahdi, Sayed Samer Ali Al-shami, and Siti Rahayu Selamat, 2018. A Review Study on Cloud Computing Issues. *1st International Conference on Big Data and Cloud Computing (ICoBiC),* May.

Rafael, 2007. *A Concept Map for Information Systems Research Approaches.* s.l., s.n., p. 845–849.

Rajkumar and Sukhpal, 2018. Sustainable Cloud Computing: Foundations and Future Directions. *Business Technology & Digital Transformation Strategies, Cutter Consortium,* 21(6), pp. 1-9.

Ramdani, 2008. *Technological, organisational and environmental factors influencing SMEs adoption of Enterprise Systems: a study in the Northwest of England.* s.l.:s.n.

Rania, 2016. *A Literature Review on Cloud Computing Adoption Issues in Enterprises.* Aalborg, Denmark: s.n.

Ravi Seethamraju, 2014. Adoption of Software as a Service (SaaS) Enterprise Resource Planning (ERP) Systems in Small and Medium Sized Enterprises (SMEs). *Information Systems Frontiers,* 27 May, 17(3), p. 475–492.

Riley P, 2017. *The Cloud in 2017: Trends in Security.* s.l.:s.n.

Robert and Frank, 1987. Choosing appropriate information systems research methodologies. 30(11), pp. 901-902.

Robert and Larry, 2011. *Educational Research: Quantitative, Qualitative, and Mixed Approaches.* Forth edition ed. s.l.:s.n.

Robert and Larry, 2011. *Educational Research: Quantitative, Qualitative, and Mixed Approaches.* Forth edition ed. s.l.:s.n.

Robert. and Frank, 1987. Choosing appropriate information systems research methodologies. 30(11), pp. 901-902.

Ronald and Russell, 2010. *Cloud Security: A Comprehensive Guide to Secure Cloud Computing.* Indianapolis, Indiana: Wiley Publishing, Inc.

Ronald, and Russell, 2010. *Cloud Security: A Comprehensive Guide to Secure Cloud Computing.* Indianapolis, Indiana: Wiley Publishing, Inc.

Ruoning and Prashant, 2014. Towards an Understanding of Cloud Computing Impact on Organizational IT Strategy. *Journal of IT Case and Applications Research.,* 7th July, 15(4), pp. 34- 54..

Ruoning, and Prashant, 2014. Towards an Understanding of Cloud Computing Impact on Organizational IT Strategy. *Journal of IT Case and Applications Research.,* 7th July, 15(4), pp. 34- 54..

Saeed, 2015. Security and Authentication and Access on Data Transfer under the Cloud Computing by using key. *International Journal of Advances in Computer Science and Technology,* June, 4(6), pp. 124-127.

Salim Al Isma'ili, Mengxiang Li, Jun Shen, Qiang He, 2016. *Cloud Computing Adoption Determinants: An Analysis of Australian SMEs.* s.l., s.n.

Sangeeta and Prerna, 2012. *Exploring the impact of Cloud Computing adoption on organizational flexibility: A client perspective.* s.l., s.n., p. 121–131.

Sangeeta, and Prerna, 2012. *Exploring the impact of Cloud Computing adoption on organizational flexibility: A client perspective.* s.l., s.n., p. 121–131.

Sangita D, et.al, 2015. A Review On Issues And Challenges Of Cloud Computing. *International Journal of Innovations & Advancement in Computer Science IJIACS,* January.4(1).

Saunders, et al., 2009. *Research Methods for Business Students.* s.l.:s.n.

Saunders, Lewis and Thornhill, 2009. *Research Methods for Business Students.* s.l.:s.n.

Scott and Elizabeth, 2005. Factors Influencing e-commerce Adoption and Use by Small and Medium Businesses. 15(4).

Sean M A, Zhi Li a , Subhajyoti B, Juheng Z, & Anand G, 2011. Cloud Computing The Business Perspective. p. 176–89.

Sekaran, 2010. *Research methods for business: A skill building approach.* s.l.:John Wiley & Sons, Inc..

Senarathna, 2016. *Cloud Computing Adoption by SMEs in Australia.* s.l.:s.n.

Shima, 2014. *Factors Influencing the Adoption of Cloud Computing by Small and Medium Size Enterprises (SMEs).* Ryerson University, Toronto, Canada, Switzerland.

Sigi and Kenneth, 2000. An analysis of the business characteristics of adopters and non-adopters of World Wide Web technology. *Information Technology and Management,* November, 1(1), pp. 129-154.

Sohel and Roger, 2009. The Impact of Electronic Data Interchange on Delivery Performance. *Publication and Operations Management Volume,* January, 10(1), pp. 16-30.

Sotirios, 2017. *Social Research.* fourth ed. s.l.:Palgrave Macmillan.

Sourabh, 2014. *What is Cloud Computing, Basic of Cloud Computing.* s.l.:s.n.

Srinivas R Kondapalli, 2016. *Adoption Of Cloud Computing and Services – An Objective Analysis.* s.l.:s.n.

Srinivasan S, 2014. *Cloud Computing Basics.* s.l.:Springer Briefs in Electrical and Computer Engineering.

Stephen, 2012. Seven Indisputable Technology Trends That Will Define 2015. *EIS Library,* N/A(N/A), p. N/A.

Subhankar, 2012. From Outsourcing to Cloud Computing: evolution of IT services. *Management Research Review,* 35(8), p. 664–675.

Subhas and Arka, 2010. *Identification Of A Company's Suitability For the Adoption of Cloud Computing and Modelling Its Corresponding Return on Investment.* s.l., ELSEVIER, p. 504–521.

Subhas, and Arka, 2010. *Identification Of A Company's Suitability For the Adoption of Cloud Computing and Modelling Its Corresponding Return on Investment.* s.l., ELSEVIER, p. 504–521.

Sumit, 2014. Public vs Private vs Hybrid vs Community - Cloud Computing: A Critical Review. *I.J. Computer Network and Information Security,* pp. 20-29.

Sumit, 2014. Public vs Private vs Hybrid vs Community - Cloud Computing: A Critical Review. *I.J. Computer Network and Information Security,* pp. 20-29.

Supriya, 2015. Prospect Of Adopting Cloud Computing In Indian Manufacturing Industry. *International Journal of Management (IJM) IAEME,* June, 6(6), pp. 48-56.

Suresh and Krishnan, 2012. *Cloud Computing Adoption And Its Implications For Cio Strategic Focus - An Empirical Analysis.* s.l., s.n.

Suresh Malladi, & M.S. Krishnan, 2012. *Cloud Computing Adoption And Its Implications For CIO Strategic Focus - An Empirical Analysis.* s.l., s.n.

Suresh, and Krishnan, 2012. *Cloud Computing Adoption And Its Implications For Cio Strategic Focus - An Empirical Analysis.* s.l., s.n.

Suruchee V. Nandgaonkar, & Prof. A. B. Raut, 2014. A Comprehensive Study on Cloud Computing. *International Journal of Computer Science and Mobile Computing (IJCSMC),* April, 3(4), pp. 733-738.

Survey: RightScale, 2018. *Survey: RightScale 2018 State of the Cloud Report™. DATA TO NAVIGATE YOUR MULTI-CLOUD STRATEGY,* s.l.: RightScale.

Suzanne C. Watson, 1998. A Primer in Survey Research. *The Journal of Continuing Higher Education,* pp. 31-40.

Swarnalata and Kamal, 2015. Secure Database as a Service-a Review. *International Journal of Advanced Research in Computer and Communication Engineering,* March, 4(3), pp. 425-429.

Swathi et al., 2014. Virtualization In Cloud Computing. *International Journal of Computer Science and Mobile Computing,* May, 3(5), pp. 540-546.

T. Krithiga, et.al, 2015. An Overview of Cloud Computing System. *International Journal of Trend in Research and Development,* 2(5), pp. 114-117.

Teófilo, Filipe and Alfonso, 2017. *Key Issues for the Successful Adoption of Cloud Computing.* s.l., ELSEVIER, p. 115–122.

Tharam, Chen and Elizabeth, 2010. *Cloud Computing: Issues and Challenges.* s.l., IEEE Computer Soceity, pp. 27-33.

Tharenou, P., et.al, 2007. *Management Research Methods.* s.l.:Cambridge University Press.

Theo et al., 2018. *Understanding the Determinants of Cloud Computing Adoption for High Performance Computing.* N/A: Proceedings of the 51st Hawaii International Conference on System Sciences.

Thomas R. Peltier, 2014. *Information Security Fundamentals.* Second Edition ed. s.l.:Auerbach .

Tiago and Maria, 2010. Understanding e-Business Adoption Across Industries in European Countries. *Industrial Management & Data System,* September, 110(9), pp. 1337-1354.

Tiago, Manoj and Mariana, 2014. Assessing The Determinants Of Cloud Computing Adoption: An Analysis Of The Manufacturing And Services Sectors. *Information & Management,* 6 April, 51(5), p. 497–510.

Tim M, Subra K, & Shahed L, 2009. *Cloud Security and Privacy.* 1st ed. s.l.:O'Reilly.

Ugochukwu and Benedict, 2012. *Will Adoption of Cloud Computing Put the Enterprise at Risk?.* s.l., IEEE Xplore.

Ugochukwu, and Benedict, 2012. *Will Adoption of Cloud Computing Put the Enterprise at Risk?.* s.l., IEEE Xplore.

Usman and Mahmood, 2011. *Cloud Computing Adoption Assessment Model (CAAM)..* s.l., ACM Digital Library, p. 34–37.

Usman, and Mahmood, 2011. *Cloud Computing Adoption Assessment Model (CAAM)..* s.l., ACM Digital Library, p. 34–37.

Vikas M, Srishti G, & Jyoti K, 2014. Network Security: Security in Cloud Computing. *International Journal Of Engineering And Computer Science (IJECS),* January, 3(1), pp. 3643-3651.

W.Lawrence, 2014. *Social Research Methods: Qualitative and Quantitative Approaches.* 7th edition ed. s.l.:Pearson Education Limited.

Wanda and Jack, 2001. Studying Information Technology in Organizations: Research Approaches and Assumptions. 2(1).

Wikipedia, Dot-com bubble, n.d. *Dot-com bubble, from Wikipedia.* s.l.:s.n.

Wikipedia, 2019. *Cloud Computing History, from Wikipedia.* s.l.:s.n.

William et al., 2013. *Business Research Methods.* Ninth Edition ed. s.l.:Mason, OH : South-Western Cengage Learning.

William H. D, 1981. Firm Size and the Characteristics of Computer Use. *MIS Quarterly.,* 5(4), pp. 65-77.

Wilson, C., 2014. Semi-Structured Interviews. *ResearchGate,* pp. pp.23-41.

Wojciech K, 2013. *Digital Signature as a Cloud-based Service.* s.l., s.n.

Won K, Soo D K, Eunseok L & Sungyoung L, 2009. *Adoption Issues for Cloud Computing.* s.l., Association for Computing Machinery, Inc (ACM), p. 2.

Xiaolin and Ahmed, 2015. *The determinants of Cloud Computing Adoption by Large European Firms.* s.l., Association for Information Systems AIS Electronic Library (AISeL).

Y Z An, Z F Zaaba, & N F Samsudin, 2016. Reviews on Security Issues and Challenges in Cloud Computing. *IOP Conference Series: Materials Science and Engineering .*

Yair and Timothy, 2006. A Systems Approach to Conduct an Effective Literature Review in Support of Information Systems Research. *Informing Science Journal,* Volume 9, pp. 181-212.

Yazan Yassen Alshamaileh, 2013. *An Empirical Investigation Of Factors Affecting Cc Adoption Among SMEs In The North East Of England.* s.l.:s.n.

Yazn, Savvas and Teta, 2013. *Cloud Ccomputing adoption in Greece..* s.l., AIS eLibrary, p. 1–17.

Yazn, Savvas, and Teta, 2013. *Cloud Ccomputing adoption in Greece..* s.l., AIS eLibrary, p. 1–17.

Yehuda, 1999. Response Rate in Academic Studies-A Comparative Analysis. *SAGE Journals,* 52(4), p. 421 – 438.

Yogesh, Michael and Nripendra, 2012. *Information Systems Theory.* s.l.:Springer.

Yvonna, Susan and Eagon, 1994. *Paradigmatic controversies, contradictions, and emerging confluences, revisited.* s.l.:Thousand Oaks: Sage Publications..

Yvonna, Susan and Eagon, 1994. *Paradigmatic controversies, contradictions, and emerging confluences, revisited.* s.l.:Thousand Oaks: Sage Publications..

Zakaria Jaadi, 2019. *Everything you need to know about interpreting correlations.* s.l.:s.n.

Zhang, Cheng and Raouf, 2010. Cloud Computing: state-of-the-art and research challenges. *Journal of Internet Services and Applications,* p. 7–18.

Appendix D - Questionnaire for Interview & Survey

SECTION ONE

1.1 Participant details

Job Title/Position	
Experience (in years)	

1.2 Demographics

Companies country in which it is located? ***Please Specify:***

What is the scope of your company? (Please tick appropriate)
National ☐ Multinational ☐ Don't Kn☐ ***Please Specify:***

Approximately how many staff are employed by company? (Please tick appropriate)
Less than 20 ☐ 20-70☐ Above than 1☐ Not ☐ ***Please Specify:***

SECTION TWO

Q-1: Types of cloud services and platforms are used?

a- SaaS	Yes	No
b- PaaS	Yes	No
c- IaaS	Yes	No
d- Other please specify _____		

Please Specify:

Q-2: Types of cloud used?

a- Public cloud	Yes	No
b- Private cloud	Yes	No
c- Hybrid cloud	Yes	No
d- Community cloud	Yes	No
e- Other please specify _____		

Please Specify:

Q-3: Who is your service provider for CC applications?

a- Microsoft	Yes	No
b- Google	Yes	No
c- Amazon	Yes	No
d- Salesforce	Yes	No
e- Rackspace	Yes	No
f- Other please specify _____		

Please Specify:

Q4: What is the sector of your Company?

- Banking & Financial Sector.
- Telecommunication & Technology Sector.
- Energy & Utility Sector.
- Legal and professional services
- Education Sector.
- Manufacturing Sector.
- Transport Sector.
- Petrochemical Industry Sector.
- Agriculture & Food Industries Sector.
- Government Sector.
- Real Estate Development Sector.
- Media & Publishing Sector.
- Healthcare Sector.
- Other (please specify):

Q5: Which of the following phrases best describes your firms' situation?

- We have already adopted some cloud services
- We intend to adopt cloud services in the next 3 years
- We don't intend to adopt any cloud services in near future

Q6: What "Information Systems Applications" has your firm adopted?

- Basic internet services (email and web)
- Web site with simple ecommerce functions
- Web site with advanced ecommerce functions
- Transaction Processing Systems such as: Payroll, Order Tracking, etc...
- Decision-Support Systems such as: Sales region analysis, cost analysis, etc...
- Management Information Systems such as: Sales management, inventory control, etc...
- Executive Support Systems such as: profit planning, Manpower planning, etc...
- Enterprise resource planning such as, SAP, Oracle and Microsoft Dynamic etc……
- Business Intelligence etc……
- Other (please specify):

Q7: Has your firm adopted or considers adopting any CC services from those listed below?

- Individual software packages
- Infrastructure services such as storage, network capacity etc
- A complete operating system and software package available via cloud services
- Security services in the cloud
- N/A
- Other (please specify)

The questionnaire objective is to find out that which factors have positive or negative impact on adoption of secure & cost effective CC. Please select the correct scale based on your best knowledge.

Likert scale (1 = strongly disagree; 2= disagree; 3 = Neutral; 4= agree; 5 strongly agree)		1	2	3	4	5
Environmental Factors						
External Support						
1	Organisations ensure to have adequate technical support before switching to CC adoption.					
2	Organisations ensure to have adequate technical support after CC adoption.					
3	The Organisation's had to provide staff training from cloud providers or other training institutions.					
Competitive Pressure:						
4	Organisation's encounter pressure from competitors to adopt CC technology great benefits including more business facilities & better operational efficiency.					
5	The CC technology help organisation about latest trends to work hard and improve themselves to have an edge over their competitors.					
Human Factors						
Top Management Support						

6	The top management is not involved in reviewing consultant's CC recommendations.					
7	The top management has no role to play in monitoring of CC adoption project.					
Organisational Factors						
Employees Cloud Knowledge						
8	Organisation's concerned about the lack of cloud knowledge or expertise.					
9	The staff need to be trained in order to use the CC.					
10	Organisation's creates awareness in staff of using CC.					
Information Intensity						
11	Organisations have fast information access, whenever & wherever they need.					
12	Organisations have reliable, relevant and accurate information.					
13	Organisations have up-to-date information all the time.					
Technological Factors						
Relative advantages						
14	The Integrity and confidentiality of data is preserved under CC model.					
15	CC improves organisation's operational efficiencies, productivity and enable to accomplish tasks more quickly.					
16	CC would enhance organisation's data storage capacity whenever needed.					
17	The pay-as-you-go model of payment makes CC an attractive solution.					
18	CC allows the staff to use the latest version of the technology and improve their performance.					
Complexity						
19	The organisation's concern about the lack of professional skill and capability to evaluate cloud solutions.					

20	The organisation's concern about the lack of standardisation.					
21	The organisations have lack of clear value proposition and funding.					
22	The organisations have lack of attractive business case for cloud adoption.					
Compatibility						
23	Using CC is compatible with organisation norms and culture.					
24	Using CC is compatible with all aspects of organisation work.					
25	Cloud can easily be integrated into organisation existing IT Infrastructure.					
Security and Privacy:						
26	Organisations ensure the data services provided by the CSPs are secure.					
27	Organisations ensure servers and data centres of CSPs' are secure.					
28	Organisations ensure the media that is used to transmit valuable data to cloud data centre is secure.					
29	Organisations ensure privacy and confidentiality of data is maintained by CSPs.					
30	The data security is the biggest challenge faced by the organisation's to adopt any new technology.					
31	A contract agreement between the organisation and the CSP has a safety and reliability of the data.					
32	Organisation ensure the provider is ISO 27001 certified and data held is encrypted.					
33	Organisations carry out penetration testing to check the CSP's security.					
34	Organisations obtain rights to audit the CSP's security.					
35	Organisations get reports from CSP on security breaches that might affect the organisations data.					

36	The adoption of CC technology by the organisation necessitates to develop a plan to protect the security and confidentiality of the information.					
37	Organisations must know where the data is stored in the CC and what is the backup plan.					
Evaluating cost						
38	Organisations focus on modern IT system projects, which aim to reduce capital investment**.**					
39	The CC helps to reduce investment in new infrastructure, eliminates the cost of upgrading the software's.					
40	The CC reduces cost of system maintenance, IT costs (such as IT personnel) and operating cost.					
41	Cost of using CC is less than the cost of purchasing and maintained in house.					
CC Adoption						
42	The organisation was able to reduce the software development time and cost of hardware.					
43	The organisation's performance has improved gradually with better communication with suppliers and customers.					
44	Low upfront investments as well as predictable and scalable operation expenses of CC.					
45	CC increased the ability of the organisation to adopt rapidly and cost efficiently in response to changes in the business environment.					
46	Organisations consider CC as a reliable and secure service than traditional computing.					
47	Using CC services can facilitate organisations to focus on core business activities rather than on IT operations.					
48	Access to services from anywhere and from/across different platforms without putting too much investment prior to the needs.					
49	Employee's performance, satisfaction and loyalty ratings have increased.					

50	The business goals of the organisation have been successfully accomplished.					