



**Cloud Adoption in SMEs:  
A Comparative Study Between Finland and the Philippines**

Jonas Panelo

Haaga-Helia University of Applied Sciences

Business of Information Technology

Research Based Thesis

2025

## Abstract

<b>Author(s)</b> Jonas Panelo
<b>Degree</b> Bachelor of Business Information Technology
<b>Report/Thesis Title</b> Cloud Adoption in SMEs: A Comparative Study Between Finland and the Philippines
<b>Number of pages and appendix pages</b> 37 + 4
<p>This thesis explores the adoption of cloud computing among small and medium-sized enterprises (SMEs) in Finland and the Philippines, with the goal of identifying the key factors influencing adoption decisions in each country. As cloud technologies continue to transform business operations globally, understanding how SMEs engage with these solutions is crucial – especially given the differences in digital infrastructure, institutional support, and organizational capacity between developed and developing economies.</p> <p>The research employed a quantitative approach, collecting survey data from SMEs operating in both Finland (n = 28) and the Philippines (n = 34). The study was guided by the Technology-Organization-Environment (TOE) framework, supported by Institutional Theory to examine how internal and external factors, along with national context, affect cloud adoption behaviour.</p> <p>The findings reveal that cloud adoption is widespread in both countries – 93% in Finland and 82% in the Philippines – yet the challenges differ significantly. SMEs in Finland benefit from stronger IT infrastructure, greater management support, and clearer regulatory guidance, while SMEs in the Philippines face limitations related to internet reliability, technical skills, and enforcement of data privacy laws. Across both samples, common drivers of adoption include perceived business efficiency, scalability, and competitive pressure, while key barriers involve security concerns, cost, and internal IT expertise.</p> <p>This study provides practical implications for SMEs, cloud service providers, and policymakers, emphasizing the need for targeted support, training, and infrastructure development. While limited by sample size and method, the research offers valuable insights into the interplay between organizational and institutional factors in shaping SME cloud adoption.</p>
<b>Key words</b> Cloud Computing, SMEs, Technology Adoption, TOE framework, Institutional Theory, Finland, Philippines, Comparative Study

# Table of Contents

1	Introduction .....	1
1.1	Background.....	1
1.2	Research Problem & Objectives.....	1
1.3	Scope and Limitations .....	2
2	Small and Medium-sized Enterprises (SMEs).....	3
2.1	Definition of SMEs.....	3
2.2	Role of SMEs in the Economy .....	3
2.3	Technology Adoption in SMEs .....	4
3	Cloud Computing and Technology Adoption.....	6
3.1	Definition and Scope of Cloud Computing .....	6
3.2	Cloud Service Models .....	7
3.3	Cloud Deployment Models .....	7
3.4	Technology Adoption Theories.....	8
3.4.1	Technology-Organization-Environment (TOE) Framework.....	8
3.4.2	Technology Acceptance Model (TAM) .....	9
3.4.3	Diffusion of Innovation (DOI) Theory .....	9
3.4.4	Unified Theory of Acceptance and Use of Technology (UTAUT).....	9
3.5	Barriers and Drivers of Cloud Adoption in SMEs .....	10
3.5.1	Drivers of Cloud Adoption .....	10
3.5.2	Barriers to Cloud Adoption .....	10
3.6	National Context and Institutional Theory .....	11
3.6.1	Finland: Strong Institutional Support .....	11
3.6.2	Philippines: Evolving Institutions and Infrastructure Challenges .....	12
3.7	Conceptual Framework .....	12
4	Research Methodology.....	14
4.1	Research Approach.....	14
4.2	Research Design.....	14
4.3	Survey Instrument .....	15
4.4	Data Collection.....	16
4.5	Data Analysis .....	16
4.6	Ethical Considerations.....	17
5	Results .....	19
5.1	Findings from Finland.....	19
	Cloud Adoption Rate (FI).....	19
	SMEs Size Distribution (FI) .....	19

Technology Factors (FI) .....	19
Organizational Factors (FI) .....	20
Environmental Factors (FI) .....	21
Reported Barriers to Adoption (FI).....	22
5.2 Findings from the Philippines .....	22
Cloud Adoption Rate (PH) .....	22
SME Size Distribution (PH) .....	23
Technology Factors (PH).....	23
Organizational Factors (PH) .....	24
Environmental Factors (PH) .....	25
Reported Barriers to Adoption (PH).....	25
5.3 Comparative Analysis.....	26
Cloud Adoption Rates .....	26
SME Size Distribution.....	27
Technology Factors.....	27
Organizational Factors .....	28
Environmental Factors .....	28
Reported Barriers to Adoption .....	29
Conclusion of Comparison .....	30
6 Discussion.....	31
6.1 Interpretation of Findings.....	31
6.2 Practical Implications.....	31
Implications for SMEs.....	32
Implications for Cloud Service Providers .....	32
Implications for Policymakers and Institutions .....	32
6.3 Limitations of the Study .....	33
6.4 Future Research Recommendations .....	34
7 Conclusion .....	35
Sources .....	36
Appendices .....	38
Appendix 1. Survey Questionnaire .....	38

# 1 Introduction

This research-based thesis explores the adoption of cloud computing in small and medium-sized enterprises (SMEs), comparing the experiences of businesses in Finland and the Philippines. As cloud computing becomes an increasingly essential technology, SMEs benefit from its cost efficiency, scalability, and enhanced business operations. However, the adoption process differs across countries due to economic, technological, and regulatory factors (Erl and Barcelo, 2024). By analysing these differences, this thesis seeks to identify the key drivers and challenges influencing cloud adoption in both regions. Ultimately, the thesis aims to provide valuable insights and practical recommendations for SMEs considering the transition to cloud-based solutions.

## 1.1 Background

Cloud computing has transformed the way businesses operate by providing scalable, cost-effective, and flexible solutions (Marston et al., 2011). Small and Medium-sized Enterprises (SMEs), which often have limited financial and IT resources, can greatly benefit from cloud adoption. However, cloud adoption rates vary across countries, influenced by factors such as digital infrastructure, economic conditions, and government policies (Mahmood and Richard, 2011).

This thesis examines the adoption of cloud computing in SMEs, comparing Finland and the Philippines. Finland, known for its advanced digital ecosystem, has a high adoption rate of cloud services, driven by government initiatives and robust IT infrastructure (Pakkanen, 2020). In contrast, the Philippines, an emerging digital economy, is experiencing a gradual shift toward cloud-based solutions, although internet connectivity challenges and cost concerns remain significant barriers (T.King, 2013).

By analysing the key drivers, challenges, and adoption strategies in these two distinct contexts, this study aims to provide valuable insights and practical recommendations for SMEs looking to transition to cloud computing.

## 1.2 Research Problem & Objectives

The primary research question guiding this thesis is “How SMEs in Finland and the Philippines adopt cloud computing and the factors influencing their decision making.” To address this question, the thesis focuses on the following objectives:

- Identify the key drivers of cloud adoption in SMEs in Finland and the Philippines.
- Examine the challenges SMEs face in adopting cloud technology.
- Compare cloud adoption strategies in both countries.

- Provide data-driven recommendations for SMEs considering the transition to cloud-based solutions.

### **1.3 Scope and Limitations**

This thesis focuses on Small and Medium-sized Enterprises (SMEs) in Finland and the Philippines that have either adopted or are considering adopting cloud computing services. Large enterprises are excluded from this research, as their adoption strategies, resource availability, and decision-making processes differ significantly from those of SMEs.

The study is limited to public, hybrid, and community cloud deployment models, as these are more commonly used by SMEs due to cost efficiency and scalability. Private cloud environments, which are typically adopted by larger organizations with dedicated IT infrastructure, are beyond the scope of this research.

While the thesis addresses key concerns such as security, regulatory compliance, and organizational readiness, it does not include a technical analysis of cloud security architectures or cryptographic mechanisms. The primary focus is on the organizational and contextual factors that influence adoption.

Due to time and resource constraints, the research adopts a quantitative methodology, relying on data collected through online survey and secondary sources. Qualitative methods such as interviews or case studies were not included but are recommended for future research to gain deeper insight into SME decision-making processes.

## 2 Small and Medium-sized Enterprises (SMEs)

This chapter provides an overview of SMEs, forming the basis for understanding their role in the study of cloud adoption. It begins by defining SMEs according to country-specific criteria in Finland and Philippines. The chapter then explores the economic significance of SMEs, their common characteristics, and limitations – particularly in relation to technology. Finally, it discusses patterns in IT adoption among SMEs and highlights key challenges they face in integrating digital solutions.

### 2.1 Definition of SMEs

Small and Medium-sized Enterprises (SMEs) are critical to economic development and innovation, particularly in both developed and emerging economies. However, their classification differs by country.

In Finland, SMEs follow the European Union (EU) definition, which classifies businesses based on staff headcount and financial turnover (*European Commission, 2020*).

- Micro-enterprises – fewer than 10 employees and annual turnover or balance sheet total not exceeding €2 million.
- Small enterprises – fewer than 50 employees and turnover or balance sheet total not exceeding €10 million.
- Medium enterprises – fewer than 250 employees and turnover not exceeding €50 million or a balance sheet total not exceeding €43 million.

In the Philippines, the Department of Trade and Industry (DTI) defines SMEs using asset size and number of employees (*Department of Trade and Industry Philippines, 2021*):

- Micro-enterprises – up to PHP 3 million in assets; 1-9 employees.
- Small enterprises – PHP 3-15 million in assets; 10-99 employees.
- Medium enterprises – PHP 15-100 million in assets; 100-199 employees. "

### 2.2 Role of SMEs in the Economy

SMEs are vital component of both developed and developing economies. They contribute significantly to employment, innovation and regional economic growth. In the European Union, SMEs account for over 99% of all businesses and provide around two-thirds of total private sector employment (*European Commission, 2020*). Similarly, in the Philippines, SMEs represent approximately 99.5% of all registered businesses and employ over 62% of the country's workforce (*Department of Trade and Industry Philippines, 2021*).

Despite their economic importance, SMEs share common structural and operational characteristics that distinguish them from larger enterprises. They typically operate with fewer employees, limited financial and technological resources, and less formalized processes ('OECD', 2021). These traits often make SMEs more flexible and adaptable to market changes, but also more vulnerable to economic shocks and competitive pressures. Decision-making is usually centralized, with owners or managers playing a key role in the strategic and technological direction of the business.

When it comes to information technology, many SMEs face notable limitations. Due to restricted budgets and in-house expertise, SMEs are often slower to adopt new IT systems or digital tools compared to larger firms (Alshamaila, Papagiannidis and Li, 2013). Investments in digital transformation can be perceived as risky, especially without a clear return on investment. Furthermore, SMEs may struggle to retain skilled IT personnel or access the necessary training and support to implement complex technologies such as enterprise software or cloud platforms.

These limitations make cloud computing an attractive solution for SMEs, offering flexible, scalable, and cost-effective access to modern IT resources. However, the degree which SMEs are able to leverage these technologies varies across regions and industries, influenced by external factors such as government support, digital infrastructure, and national policy – factors explored in later sections of this thesis.

### **2.3 Technology Adoption in SMEs**

SMEs are increasingly adopting digital technologies to remain competitive, improve operational efficiency, and respond to changing customer expectations. However, due to their limited financial and technical resource, SMEs often face constraints in adopting and managing traditional IT systems (Alshamaila, Papagiannidis and Li, 2013). This makes cloud computing and other on-demand technologies particularly attractive due to their affordability, flexibility, and scalability (Armbrust *et al.*, 2010).

In recent years, digital adoption patterns among SMEs have shown a growing shift toward cloud-based tools, e-commerce platforms, customer relationship management (CRM) systems, and data analytics ('OECD', 2021). In Finland, digitalization is relatively advanced, with many SMEs leveraging cloud services for collaboration, remote work, and automation (*European Commission*, 2020). In contrast, SMEs in the Philippines show a more gradual adoption path, often influenced by infrastructure limitations and cost concerns (*Philippines - Digital Economy*, 2024).

Despite growing interest in digital solutions, several challenges persist:

- Cost-effectiveness – the pay-as-you-go model of cloud computing reduces upfront costs and allows SMEs to pay only for the resources they use (Marston *et al.*, 2011; Erl and Barcelo, 2024).
- Scalability and Flexibility – SMEs benefit from the ability to scale cloud resources up or down based on real-time demand (Armbrust *et al.*, 2010).
- Security Concerns – concerns about data security and compliance influence adoption readiness, especially in countries with weaker enforcement mechanisms (Buyya, Vecchiola and Selvi, 2013).
- Internet Infrastructure – reliable internet connectivity is essential. Finland's advanced infrastructure contrasts with the inconsistent broadband coverage in the Philippines (Telecommunication Union, 2021).
- Regulatory Compliance – legal frameworks such as the GDPR in Finland and the Data Privacy Act of 2012 in the Philippines shape adoption behaviour (*National Privacy Commission, 2022*).

Beyond these barriers, SMEs also face human and organizational challenges, including limited in-house IT skills, resistance to change, and the need for digital training (Oliveira, Thomas and Espadanal, 2014). These factors shape not only adoption decisions but also how effectively technologies are integrated into business operations.

The specific drivers and barriers to cloud adoption – as a core component of SME digital transformation – are further explored in Chapter 3.5, where this discussion is linked to the TOE framework and broader national context.

### **3 Cloud Computing and Technology Adoption**

This chapter introduces the key concepts and theoretical foundations related to cloud computing and its adoption among SMEs. It begins by defining cloud computing and outlining its core characteristics, followed by an overview of the main service and deployment models. The chapter also explores the specific benefits and challenges that cloud technologies present to SMEs. To support the research framework, several technology adoption theories are presented, with the Technology-Organization-Environment (TOE) framework serving as the primary lens. In addition, Institutional Theory is used to explain how national context influences adoption decisions, particularly in comparing Finland and the Philippines. The chapter concludes with a conceptual framework that connects these elements and guides the overall study.

#### **3.1 Definition and Scope of Cloud Computing**

Cloud computing is defined by the National Institute of Standards and Technology (NIST) as “a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell and Grance, 2011). This definition highlights the flexibility, scalability, and self-service nature of cloud computing.

In line with the NIST definition, cloud computing is typically characterized by five essential features that distinguish it from traditional IT models. First, on-demand self-service enables users to automatically provision computing resources as needed, without requiring human interaction with service providers. Second, broad network access ensures that services are accessible over the network through standard devices such as laptops, smartphones, or tablets. Third, resource pooling allows cloud providers to serve multiple customers using a multi-tenant model, dynamically assigning and reassigning resources according to demand. Fourth, rapid elasticity provides the ability to scale resources up or down quickly in response to changing workload requirements. Finally, measured service means that resource usage is monitored, controlled, and reported, supporting a pay-per-use or subscription-based billing model (Mell and Grance, 2011). These characteristics form the technical foundation that makes cloud computing especially attractive to SMEs seeking flexible and scalable IT solutions.

### 3.2 Cloud Service Models

Cloud computing is typically categorized into three primary service models:

- Infrastructure as a Service (IaaS) – provides virtualized computing infrastructure over the internet, such as storage networks, and servers. Example providers include Amazon Web Services (AWS EC2) and Microsoft Azure Virtual Machines.
- Platform as a Service (PaaS) – delivers hardware and software tools for application development, allowing developers to build and deploy applications without managing the underlying infrastructure. Examples include Google App Engine and AWS Elastic Beanstalk.
- Software as a Service (SaaS) – offers software applications hosted in the cloud, accessible via web browser and typically delivered on a subscription basis. Popular examples include Microsoft 365, Google Workspace, and Dropbox.

In addition to these core models, several emerging service models have gained traction. These include:

- Function as a Service (FaaS), also known as serverless computing, which allows developers to execute functions in response to events without managing servers (e.g., AWS Lambda).
- Database as a Service (DBaaS), which provides fully managed database solutions like Amazon RDS or MongoDB Atlas.
- Backend as a Service (BaaS), used in mobile and web development, offering tools like user authentication and cloud storage (e.g., Firebase)
- Desktop as a Service (DaaS), which delivers virtual desktop environments over the cloud, often used in remote or hybrid work settings (e.g., Amazon WorkSpaces, Citrix).
- Machine Learning as a Service (MLaaS), which provides machine learning tools and APIs for developers without deep AI expertise (e.g., Google AI Platform, Azure ML Studio).

These additional service models reflect growing diversity and specialization of cloud offerings tailored to meet a wide range of enterprise and development needs (Buyya, Vecchiola and Selvi, 2013; Erl and Barcelo, 2024).

### 3.3 Cloud Deployment Models

Cloud deployment models refer to how cloud services are delivered and accessed:

- Public Cloud – services are offered over the internet and shared among multiple users. It is cost-effective and widely scalable.
- Private Cloud – exclusive use by a single organization, often hosted internally or by a third-party provider. It offers greater control and security.

- Hybrid Cloud – combines public and private clouds, allowing businesses to manage sensitive operations in a private environment while benefiting from the scalability of the public cloud.
- Community Cloud – shared by organizations with common objectives or regulatory concerns, such as government or healthcare entities (Buyya, Vecchiola and Selvi, 2013).

Cloud Computing allows SMEs to leverage enterprise-grade technologies without large capital investments. By paying only for the resources they use, SMEs gain flexibility, reduce IT maintenance costs, and improve scalability. However, adoption levels differ across countries due to varying economic conditions, infrastructure quality, and regulatory environments (Armbrust et al., 2010; Buyya, Vecchiola and Selvi, 2013)

### **3.4 Technology Adoption Theories**

Technology adoption theories provide structured frameworks to understand how and why small and medium-sized enterprises (SMEs) adopt cloud computing. These theories help to interpret adoption behaviour based on internal and external organizational factors. This study primarily employs the Technology Organization Environment (TOE) framework as its core lens, while also drawing support from the Technology Acceptance Model (TAM), the Diffusion of Innovation (DOI) theory, and the Unified Theory of Acceptance and Use of Technology (UTAUT) to enrich the analysis.

#### **3.4.1 Technology-Organization-Environment (TOE) Framework**

The TOE framework proposed by Tornatzky and Fleischer (1990) is widely used to analyze technological innovation in businesses. It identifies three key dimensions that influence technology adoption:

- Technological context – includes perceived relative advantage, compatibility, and complexity of cloud technologies.
- Organizational context – refers to company size, top management support, technical skills, and resource availability.
- Environmental context – encompasses industry competition, vendor support, and regulatory environment.

This framework is especially relevant for SMEs, as it holistically considers internal capabilities and external pressures that shape adoption decisions (Tornatzky, Fleischer and Chakrabarti, 1990; Oliveira, Thomas and Espadanal, 2014).

### 3.4.2 Technology Acceptance Model (TAM)

Developed by Davis (1989), the TAM focuses on user perceptions as primary drivers of technology adoption. It introduces two critical constructs:

- Perceived Usefulness (PU) – the belief that cloud computing enhances job performance or business efficiency.
- Perceived Ease of Use (PEOU) – the extent to which cloud technologies are perceived as user-friendly and easy to implement.

TAM is useful in understanding whether decision-makers in SMEs perceive cloud technologies as valuable and accessible tools to support operations (Venkatesh *et al.*, 2003).

### 3.4.3 Diffusion of Innovation (DOI) Theory

Everette Rogers' DOI theory explains how innovations are adopted within a social system over time. It categorizes adopters into five groups:

- Innovators – risk-takers who explore new technologies early.
- Early Adopters – influencers who embrace innovations and often guide others.
- Early Majority – individuals who adopt once a technology gains broader acceptance.
- Late Majority – skeptics who adopt out of necessity or pressure.
- Laggards – conservative users who resist change.

The DOI theory is valuable in comparing adoption maturity between SMEs in Finland (likely early adopters) and the Philippines (often early or late majority), due to differences in economic and technological infrastructure (Rogers, 2003; Oliveira, Thomas and Espadanal, 2014).

### 3.4.4 Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT model, developed by Viswanath Venkatesh, integrates elements from eight earlier adoption models, including TAM and DOI. It identifies four core factors influencing technology acceptance:

- Performance expectancy – expected improvements in productivity or service delivery.
- Effort expectancy – perceived ease of using the technology.
- Social influence – influence from peers, industry norms, or customers.
- Facilitating conditions – access to resources and support required to implement cloud solutions.

UTAUT is particularly relevant for examining how external drivers – such as government incentives, IT training, and vendor support – can shape cloud adoption in SMEs (Venkatesh *et al.*, 2003).

### **3.5 Barriers and Drivers of Cloud Adoption in SMEs**

Building on the initial factors discussed in Section 2.2.1, this section explores in more depth the key drivers and barriers that influence SMEs in adopting cloud computing. These factors are directly aligned with the Technology-Organization-Environment (TOE) framework, particularly under the technological and environmental dimensions, and they help explain varying adoption trends between Finland and the Philippines.

#### **3.5.1 Drivers of Cloud Adoption**

SMEs adopt cloud computing primarily due to the following motivations:

- **Cost Efficiency** – cloud services eliminate the need for large capital investments in IT infrastructure. The pay-as-you-go pricing model allows SMEs to reduce operational costs while accessing enterprise-level technology (Marston *et al.*, 2011; Erl and Barcelo, 2024).
- **Scalability and Flexibility** – cloud computing allows SMEs to scale their resources according to business demand. This dynamic provisioning is especially valuable for small businesses facing seasonal or fluctuating workloads (Armbrust *et al.*, 2010).
- **Support for Remote Work and Collaboration** – cloud-based platforms facilitate access to business tools and data from any location, enhancing productivity and remote collaboration – a trend accelerated by the COVID-19 pandemic (OECD, 2021).
- **Enhanced Security Features** – major cloud service providers offer sophisticated security technologies, including encryption, multi-factor authentication, and compliance with international standards. These features are particularly attractive for SMEs without in-house cyber security capabilities (Buyya, Vecchiola and Selvi, 2013).

#### **3.5.2 Barriers to Cloud Adoption**

Despite the benefits, SMEs face several challenges that hinder full cloud adoption:

- **Data Security and Privacy Concerns** – fear of data breaches, unauthorized access, and loss of control over sensitive information remain key barriers. This is especially prevalent among SMEs in the Philippines, where enforcement of data protection laws can be inconsistent (Mahmood and Richard, 2011; Alharbi, 2014).

- Lack of Technical Expertise – many SMEs lack internal IT personnel with cloud-specific skills. Without proper knowledge or support, adopting and managing cloud infrastructure can seem risky or overwhelming (Low, Chen and Wu, 2011).
- Unreliable Internet Connectivity – cloud computing depends heavily on stable and fast internet. While Finland benefits from a robust digital infrastructure, the Philippines struggles with inconsistent speeds and limited broadband access, particularly in rural areas (Telecommunication Union, 2021).
- Regulatory Uncertainty – data protection and compliance requirements vary across regions. Finnish SMEs operate under the GDPR, which offers clear guidelines, whereas SMEs in the Philippines must navigate the Data Privacy Act of 2012 – an evolving but less strictly enforced framework (*European Commission, 2020; National Privacy Commission, 2022*).

### **3.6 National Context and Institutional Theory**

This section offers a valuable lens for understanding how national environments shape organizational behavior, including technology adoption decisions. According to Scott (2001), institutions comprise regulative, normative, and cultural-cognitive structures that influence organizational actions and expectations. These institutional elements can significantly affect how SMEs perceive and adopt cloud computing across different countries (Scott, 2001).

In the context of this study, institutional theory helps to explain why SMEs in Finland and the Philippines experience cloud adoption differently, not only because of economic conditions or infrastructure, but also due to the broader institutional environments that guide business behaviour.

#### **3.6.1 Finland: Strong Institutional Support**

Finland represents a mature digital economy supported by robust legal frameworks, strong public institutions, and highly developed IT infrastructure. The country's strict enforcement of the General Data Protection Regulation (GDPR) ensures high data privacy standards, giving SMEs confidence in adopting cloud services (*European Commission, 2020*). Additionally, Finland's innovation-friendly policies, high-quality education system, and widespread broadband connectivity contribute to a favorable environment for technology adoption (OECD, 2021).

Government-backed digitalization programs, such as Business Finland's innovation funding and the Digital Compass initiative, further encourage SMEs to leverage cloud-based solutions. These formal structures create a setting in which cloud adoption is seen as both legitimate and strategically beneficial.

### 3.6.2 Philippines: Evolving Institutions and Infrastructure Challenges

In contrast, the Philippines represents an emerging digital economy where institutional structures are still developing. While the Data Privacy Act of 2012 provides a legal framework for data protection, enforcement remains inconsistent, particularly among small businesses (*National Privacy Commission, 2022*). This can lead to hesitation or confusion about compliance when adopting cloud services.

Additionally, the Philippines faces infrastructure-related barriers, including uneven broadband access and limited cloud training for SMEs (Telecommunication Union, 2021). While initiatives like DICT's Digital Transformation Center Program aims to promote SME digitalization, gaps remain in institutional capacity, regulatory clarity, and public-private collaboration.

The institutional environment in the Philippines is also shaped by informal norms, such as organizational resistance to change, reliance on traditional IT practices, and trust issues with foreign cloud vendors. These factors can slow the diffusion of cloud technologies among SMEs despite the recognized benefits.

This comparative institutional perspective highlights the importance of national-level enablers and constraints in shaping SME cloud adoption. Understanding these dynamics is critical to interpreting the survey results in the following chapters.

## 3.7 Conceptual Framework

To guide this study, a conceptual framework has been developed based on the Technology-Organization-Environment (TOE) framework, which provides a comprehensive lens for understanding technology adoption among small and medium-sized enterprises (SMEs). The model is further supported by Institutional Theory, which adds depth to the analysis by considering how national environments shape organizational behaviour. The country context – specifically, the comparison between Finland and the Philippines – is introduced as a moderating variable.

The framework proposes that cloud adoption among SMEs is influenced by three dimensions:

- Technology – factors such as perceived benefits, compatibility with current systems, perceived complexity, and security features.
- Organization – internal characteristics like firm size, IT readiness, availability of skilled personnel and top management support.
- Environment – external influences including competitive pressure, vendor support, regulatory compliance, and internet infrastructure.

The country context moderates the relationships between these TOE factors and cloud adoption. Differences in digital maturity, regulatory environments, economic development, and institutional support systems are expected to influence how SMEs in Finland and the Philippines perceive and respond to these factors.

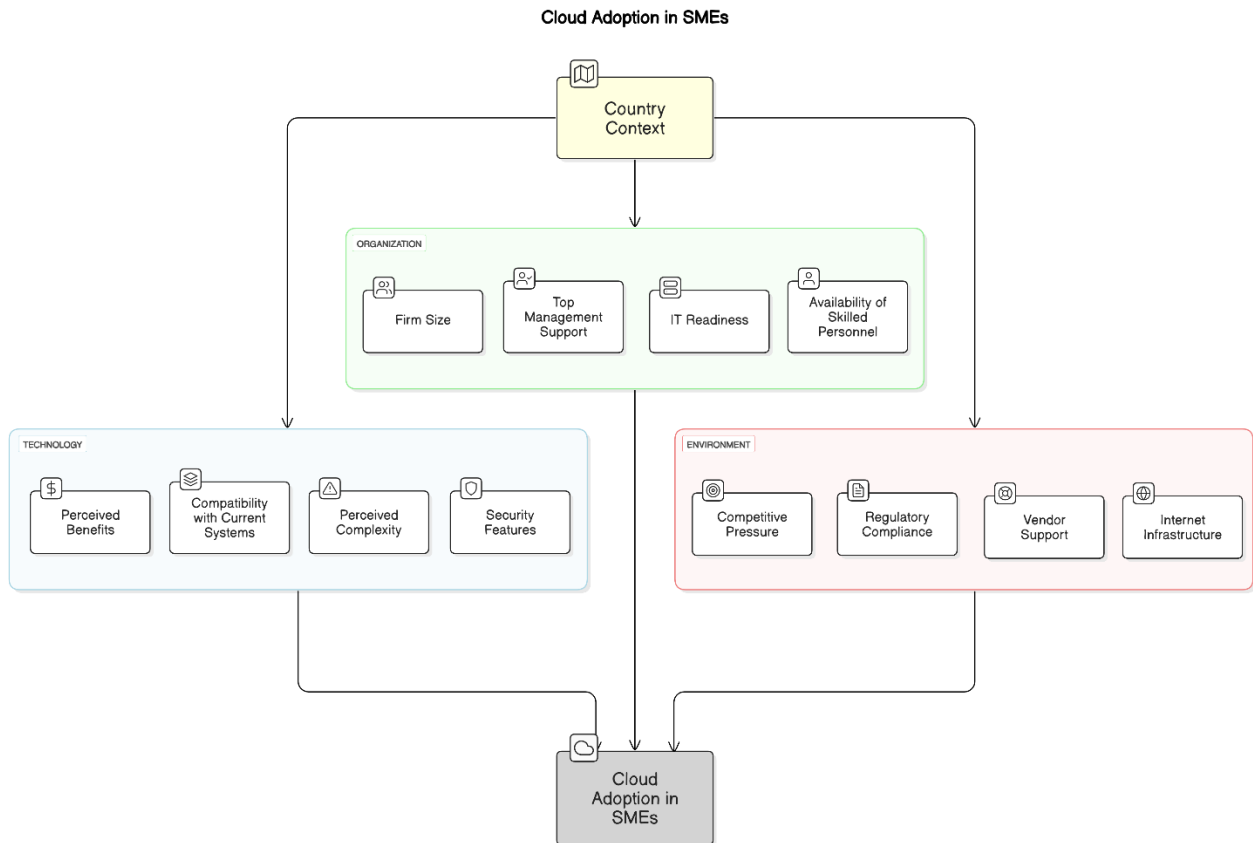


Figure 1. Conceptual Framework Based on the TOE Model (Tornatzky, Fleischer and Chakrabarti, 1990)

As illustrated in the conceptual framework diagram (Figure 1), this model captures the dynamic interplay of internal and external variables in shaping cloud adoption outcomes in SMEs, while emphasizing how national context can alter these relationships.

## **4 Research Methodology**

This chapter outlines the research approach, design, and methods used to investigate how small and medium-sized enterprises (SMEs) in Finland and the Philippines adopt cloud computing, and what factors influence their decision making. It presents the chosen methodology, the rationale behind using a quantitative approach, and details the survey instrument developed for data collection. The chapter also describes the target population, data collection procedures, methods of analysis, and ethical considerations. By providing a clear explanation of how the study was conducted, this chapter ensures transparency, replicability, and academic validity.

### **4.1 Research Approach**

This study adopts a quantitative research approach to examine how small and medium-sized enterprises (SMEs) in Finland and the Philippines adopt cloud computing and what factors influence their decision-making. A quantitative approach is appropriate for this research as it allows for the collection of measurable data from a broad range of respondents, enabling statistical comparisons between the two countries.

The structured survey used in this study was designed to capture key variables based on the Technology-Organization-Environment (TOE) framework and Institutional Theory. These models provide a theoretical lens through which the internal and external factors influencing cloud adoption can be assessed. By using this approach, the research can systematically evaluate patterns, identify differences in adoption trends, and quantify the impact of influencing factors such as infrastructure, company size, and policy environment.

A comparative analysis was employed to explore national differences in adoption behaviour. This is particularly relevant given the contrasting digital maturity, economic structures, and regulatory landscapes of Finland and the Philippines. The quantitative approach ensures that findings are both replicable and generalizable within the SME sector of each country.

### **4.2 Research Design**

This research utilizes a comparative, cross-sectional survey design to analyse cloud computing adoption among SMEs in Finland and the Philippines. A cross-sectional design was selected to gather data at a specific point in time, enabling the study to identify current adoption patterns, influencing factors, and differences between the two national contexts.

The comparative nature of the study allows for an in-depth understanding of how varying institutional environments, technological readiness, and organizational capabilities impact cloud adoption. By examining two countries with different levels of digital infrastructure and regulatory frameworks, the research seeks to uncover both common trends and contextual differences in SME behaviour. Additionally, the research design is supported by a structured framework, previously discussed in the earlier chapter, to guide the development of the survey instrument and the analysis of results.

This design supports the objective of producing a structured and evidence-based comparison between the two countries, contributing valuable insights for policymakers, technology providers, and SMEs themselves.

### **4.3 Survey Instrument**

The primary data collection tool used in this research was a structured online survey questionnaire, designed to gather relevant data from SMEs in both Finland and the Philippines. The survey instrument was developed in English and distributed digitally to reach a wide range of SME respondents, including business owners, IT managers, and decision-makers.

The questionnaire consisted of both closed-ended and multiple-choice questions, alongside Likert scale statements to assess perceptions and agreement levels. The instrument was divided into six key sections:

- **Company Background** – this section included questions about the respondent's country, business size (using country-specific SME definitions), and professional role.
- **Cloud Adoption Status and Trends** – questions explored whether the company had adopted cloud computing, the timeline of adoption, current usage trends, and if applicable, reasons for non-adoption.
- **Types and Purposes of Cloud Usage** – this section focused on which cloud services the company uses (e.g., IaaS, SaaS, PaaS) and for what purposes (e.g., data storage, hosting apps etc.)
- **Technology, Organization, and Environment (TOE) Factors** – respondents were asked to rate their level of agreement with various statements representing TOE dimensions, including technological readiness, organizational capabilities, and environmental influences.
- **Barrier to Cloud Adoption** – participants could select one or more challenges their business has faced or anticipates in adopting cloud services.
- **Institutional and National Context** – this section evaluated country-level support, infrastructure, and regulatory confidence based on the respondents' perceptions, helping to link national context with adoption behaviour.

Each section of the survey was designed to provide quantitative data for cross-country comparison while also reflecting the constructs outlined in the theoretical framework. The questions were phrased in clear and practical language to ensure they were accessible to both technical and non-technical participants.

#### **4.4 Data Collection**

Data for this study was collected through an online survey distributed to SMEs in Finland and the Philippines. The survey was conducted using a web-based form and shared via social media platforms and professional networks. The distribution channels were selected to ensure accessibility and to maximize participation from a geographically and professionally diverse group of SME respondents.

The survey was open for responses for three weeks and during this period, participants were invited to complete the questionnaire voluntarily and anonymously. Before answering, each respondent was presented with a brief introduction outlining the purpose of the research, estimated completion time, and assurance of confidentiality.

To ensure the relevance of responses, only participants affiliated with SMEs were eligible to answer the survey. Country-specific definitions of SMEs, based on the European Union (EU) for Finland and the Department of Trade and Industry (DTI) for the Philippines, were used to categorized enterprise size. Large enterprises were excluded from the study to maintain focus on the SME sector.

No personal or sensitive information was collected, and participation was entirely optional. Respondents were able to skip questions they did not feel comfortable answering.

#### **4.5 Data Analysis**

The survey data was analysed using a quantitative approach, focusing on descriptive statistics to explore cloud adoption patterns among SMEs in Finland and the Philippines. Responses were exported in Excel format from the survey platform, where Likert-scale questions had already been summarized into percentage distributions and average scores. These were further reviewed using Microsoft Excel to clean, filter, and prepare the data for cross-country comparison.

A total of 62 responses were collected, with 28 from Finland (45.2%) and 34 from the Philippines (54.8%). To ensure data quality, only entries from small and medium-sized enterprises (SMEs) were included based on country-specific SME definitions. No responses from large enterprises were considered.

Descriptive statistics such as frequencies, percentages, and mean scores were used to analyse:

- Cloud adoption rates
- Types and purposes of cloud service use
- Perceived benefits and challenges
- TOE (Technology-Organization-Environment) factors
- Institutional and national-level support

Key analytical focus areas included:

- Adoption Rate – 87% of respondents indicated their company had already adopted cloud computing services.
- TOE Dimensions – average scores revealed strong agreement with benefits like improve efficiency (4.3) and top management support (4.1), while cloud training (3.3) and vendor support (3.4) were rated lower.
- Environmental & Institutional Factors – notable differences were observed in perceptions of infrastructure, policy clarity, and government support, with institutional backing rated higher in Finland than in the Philippines.

To identify national trends, data was segmented by country and compared using tables and visualizations. This allowed the study to assess how SMEs in different environments respond to similar technological, organizational, and external pressures. The findings are presented in Chapter 5, supported by graphs and commentary that reflect the survey structure and theoretical framework.

#### **4.6 Ethical Considerations**

Ethical principles were carefully followed throughout the planning and execution of this research to ensure the protections, privacy, and well-being of all participants. Participants in the survey was entirely voluntary, and respondents were informed that they could choose not to answer specific questions or exit the survey at any time without consequence. An introductory statement at the beginning of the survey explained the purpose of the study, how the data would be used, and that all responses would remain anonymous and confidential.

No personal, identifiable, or sensitive information was collected during the data gathering process. The survey focused solely on organizational-level insights and general respondent roles within their company, without requesting names, email addresses, or company names.

The research followed the ethical guidelines of Haaga-Helia University of Applied Sciences, ensuring academic integrity and respect for participants' rights. The survey was designed to avoid harm, coercion, or pressure, and participants were given the freedom to complete the questionnaire at their own pace. All collected data was securely stored and used strictly for the purpose of this thesis.

## 5 Results

### 5.1 Findings from Finland

This section presents the findings gathered from SMEs based in Finland regarding cloud adoption, structured according to the Technology-Organization-Environment (TOE) framework. A total of 28 valid responses were collected, providing insights into adoption trends, organizational enablers, environmental support, and key challenges.

#### Cloud Adoption Rate (FI)

Among the 28 respondents, 26 SMEs (93%) indicated that they had adopted cloud computing solutions. Only one SME had not adopted cloud services, and another was still in the consideration phase. This high adoption rate reflects Finland's strong national digital strategy, widespread technological readiness, and established cloud infrastructure. It suggests that cloud computing is already well-integrated into the operational strategies of many SMEs.

#### SMEs Size Distribution (FI)

Among respondents operating in Finland:

- 9 were micro-enterprises
- 13 were small enterprises
- 6 were medium-sized enterprises

This distribution shows a balanced representation across SME categories, which helps in generalizing the adoption behaviour across varying resource capacities. Notably, even micro-enterprises reported adopting cloud technologies, indicating a supportive environment that enables even the smallest firms to engage with digital transformation.

#### Technology Factors (FI)

Respondents rated their agreement with various technology-related statements on a 5-point Likert scale. The results indicate strong confidence in the benefits of cloud computing among SMEs in Finland.

As shown in Figure 2, the highest-rated factor was business efficiency (4.5), followed by compatibility with existing systems (4), ease of implementation (3.9), and confidence in cloud security (3.9)

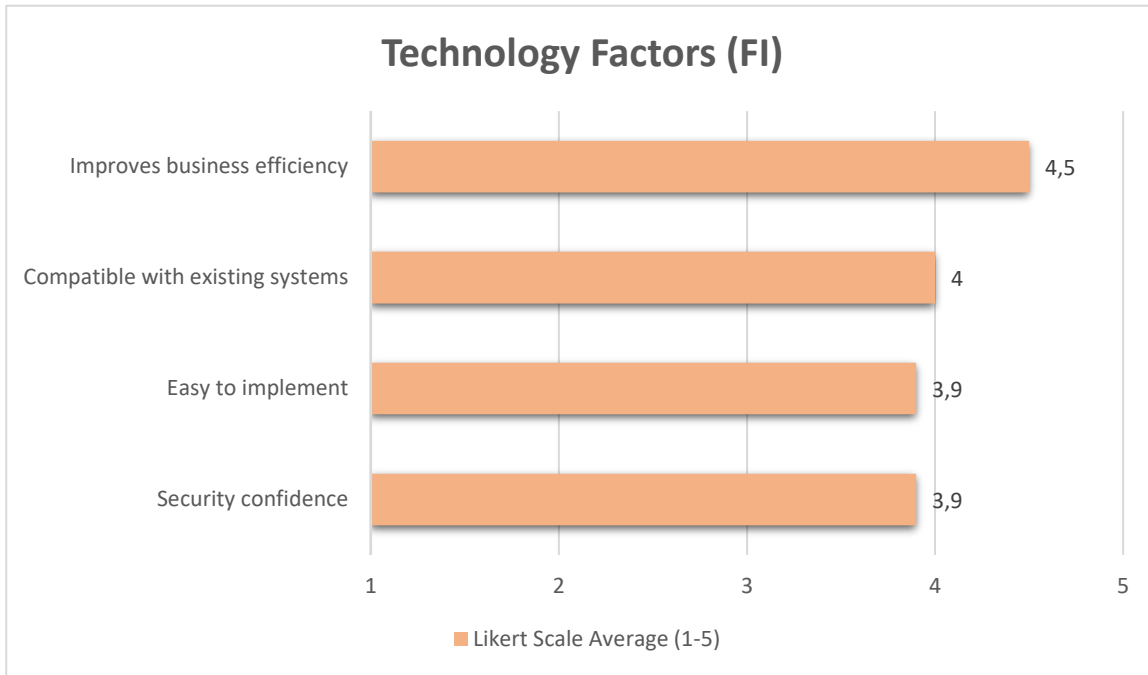


Figure 2. Technology Factor Ratings in Finland (Source: Author's survey, 2025)

These results reflect strong digital awareness and trust in cloud platforms. The high efficiency and compatibility scores suggest that most SMEs have already tailored their operations to integrate with cloud-based workflows. Although slightly lower, the ease of implementation and security ratings still indicate a generally smooth transition process.

### Organizational Factors (FI)

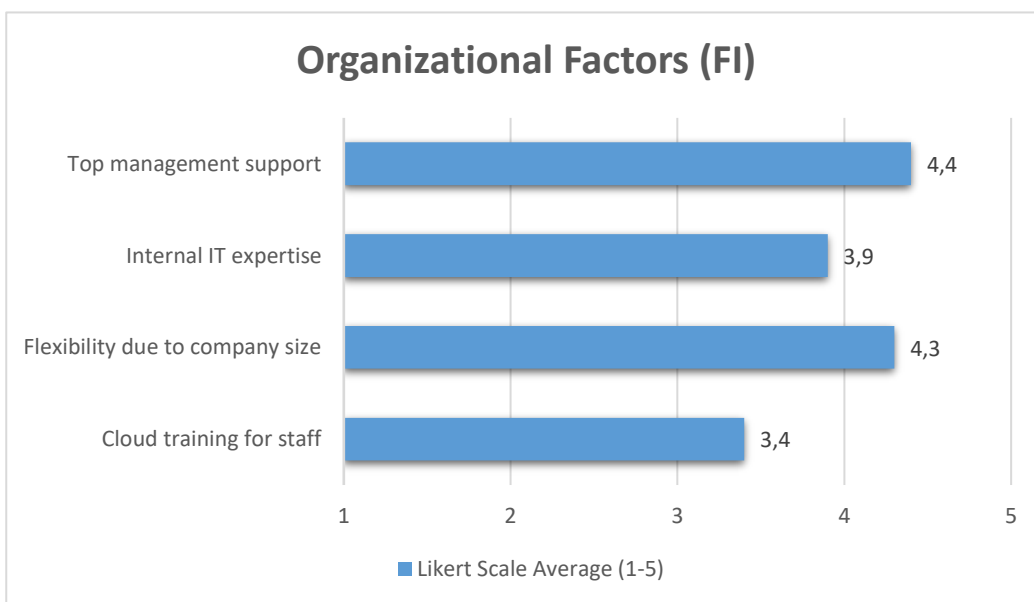


Figure 3. Organization Factor Ratings in Finland (Source: Author's survey, 2025)

The survey results suggest that SMEs in Finland are generally well-supported internally when it comes to cloud adoption. As shown in Figure 3, top management support received the highest average rating (4.4), followed closely by organizational flexibility due to company size (4.3) and internal IT expertise (3.9). Cloud training for staff received a lower score (3.4) indicating a potential area for improvement.

These results highlight the importance of strong leadership and agile organizational structures in supporting technology adoption. Although technical expertise is relatively high, the lower training scores suggest a need for more structured upskilling initiatives to main long-term cloud competency.

### Environmental Factors (FI)

Environmental factors also play a supportive role in cloud adoption among SMEs in Finland. As shown in Figure 4, internet infrastructure reliability received the highest average rating (4.6), reinforcing Finland's reputation for excellent digital connectivity. Competitor adoption pressure was tested at 3.9, indicating moderate competitive influence. Vendor support and regulatory clarity received slightly lower ratings of 3.6 and 3.5, respectively.

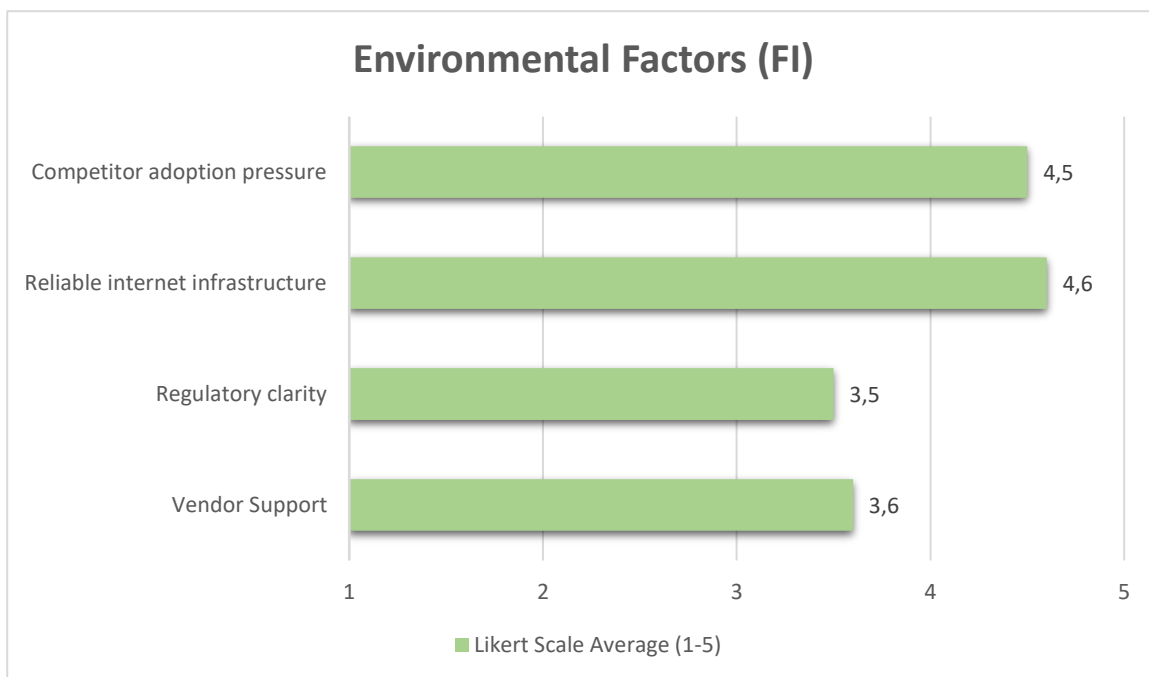


Figure 4. Environmental Factor Ratings in Finland (Source: Author's survey, 2025)

The very high score for internet infrastructure confirms Finland's reputation for reliable, high-speed connectivity, which is essential for cloud operations. Moderate ratings for regulatory clarity and

vendor support suggest that while the environment is generally favourable, there may still be room for improvement in policy communication and vendor engagement.

### **Reported Barriers to Adoption (FI)**

Despite the high level of adoption, SMEs in Finland identified a few recurring concerns:

- Security concerns – 19 mentions
- Regulatory clarity – 14 mentions
- Cost concerns – 7 mentions
- Lack of internal skills – 6 mentions
- Uncertain return of investment – 4 mentions
- Internet reliability – 2 mentions
- Other concerns – 5 mentions

The results suggest that even in a mature digital economy, security remains a top concern, consistent with global SME trends. Regulatory clarity also stands out as a challenge, likely due to the complex and evolving nature of data protection laws like GDPR. Cost and skill concerns, though less frequently mentioned, still appear as secondary challenges, particularly for smaller firms.

## **5.2 Findings from the Philippines**

This section presents the survey findings from SMEs in Philippines regarding cloud computing adoption. The results are analysed using the Technology-Organization-Environment (TOE) framework. A total of 34 valid responses were collected from SMEs across the Philippines, providing insights into adoption levels, organizational capacity, environmental conditions, and perceived barriers.

### **Cloud Adoption Rate (PH)**

Out of the 34 SMEs surveyed in the Philippines, 28 respondents (82%) indicated that they have already adopted cloud computing solutions. The remaining 6 have not yet adopted, and none reported being in a consideration phase. This high adoption rate reflects a growing interest in digital solutions, though it is slightly lower than the rate observed in Finland. The difference may be attributed to challenges such as infrastructure gaps, budget constraints, and varying levels of digital literacy.

### SME Size Distribution (PH)

Among respondents operating in the Philippines:

- 8 micro-enterprises
- 20 small enterprises
- 6 medium-sized enterprises

The data shows that small enterprises form the majority of respondents, aligning with the structure of the broader Philippine economy, where small businesses make up a significant portion of the private sector. This composition is relevant because adoption dynamics can vary by firm size, especially in terms of access to funding, digital tools, and skilled personnel.

### Technology Factors (PH)

As shown in Figure 5, the responses to technology-related statements show generally positive perceptions. SMEs in the Philippines recognize the operational advantages of cloud computing, although their enthusiasm is slightly more conservative than their Finnish counterparts.

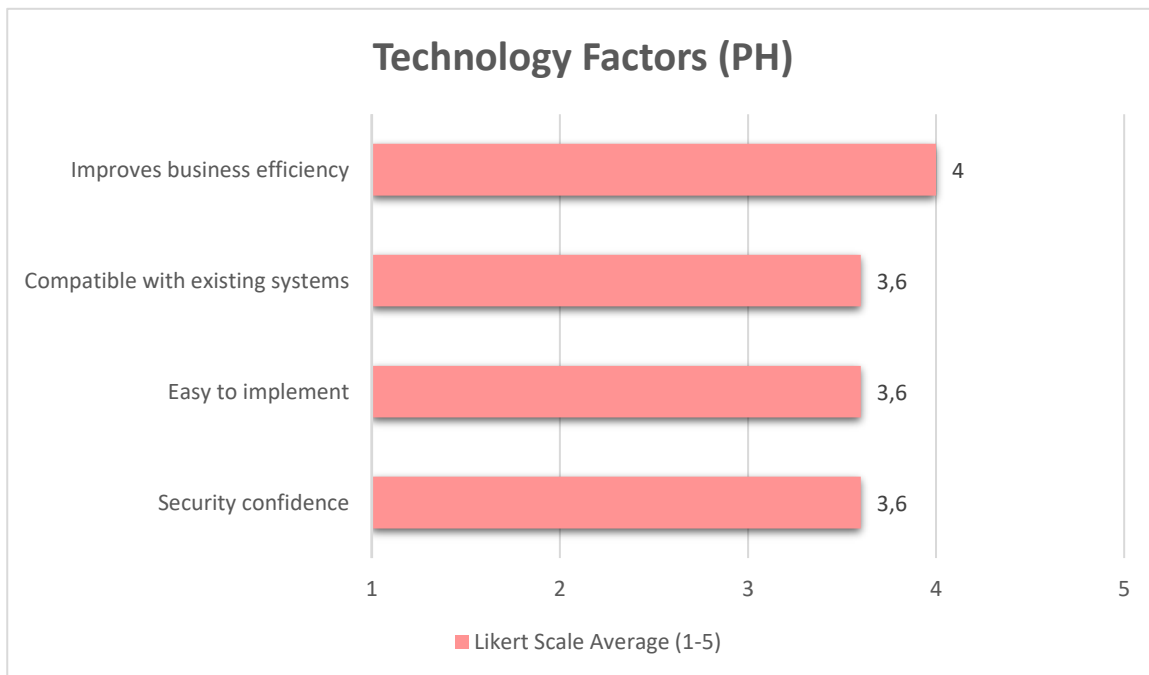


Figure 5. Technology Factor Ratings in the Philippines (Source: Author's survey, 2025)

These results suggest that cloud services are appreciated for their value and functionality, but lingering concerns remain regarding system compatibility, ease of transition, and data security. The slight hesitation may also stem from past experiences or a lack of technical support during implementation.

### Organizational Factors (PH)

The survey assessed how internal organizational factors influence cloud adoption among SMEs in the Philippines. As shown in Figure 6, top management support and organizational flexibility received relatively strong ratings (3.9), suggesting a willingness to embrace cloud technologies. Internal IT expertise was rated slightly lower at 3.6, and cloud training availability received the lowest score at 3.1.

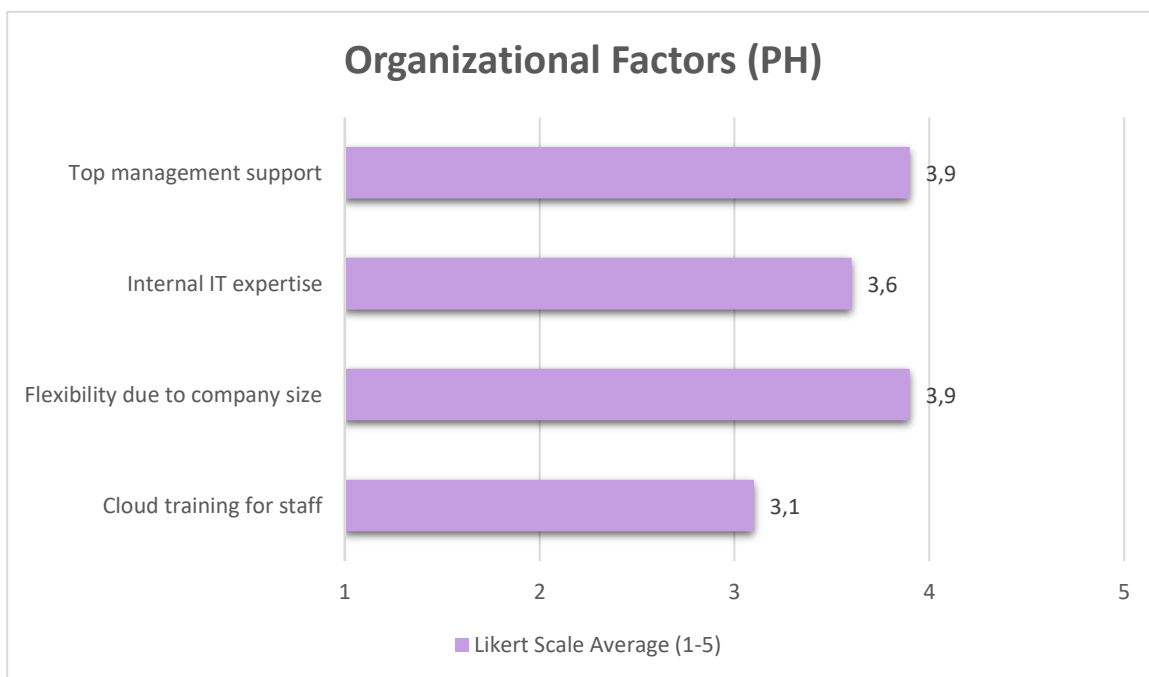


Figure 6. Organizational Factor Ratings in the Philippines (Source: Author's survey, 2025)

SMEs in Philippines demonstrate moderate organizational readiness. While there is visible support from management and some level of adaptability, gaps in technical skills and training access stand out. Many SMEs may lack dedicated IT departments or budget allocations for professional development in cloud technologies, which can slow down successful adoption or limit optimization.

### Environmental Factors (PH)

The external environment poses several challenges for cloud adoption among SMEs in the Philippines. As shown Figure 7, competitor adoption pressure received the highest rating (3.7), suggesting that market dynamics play a role in motivating cloud adoption. In contrast, internet infrastructure reliability (3.2), regulatory clarity (3.3), and vendor support (3.2) were rated more moderately, indicating that foundational support structures remain underdeveloped.

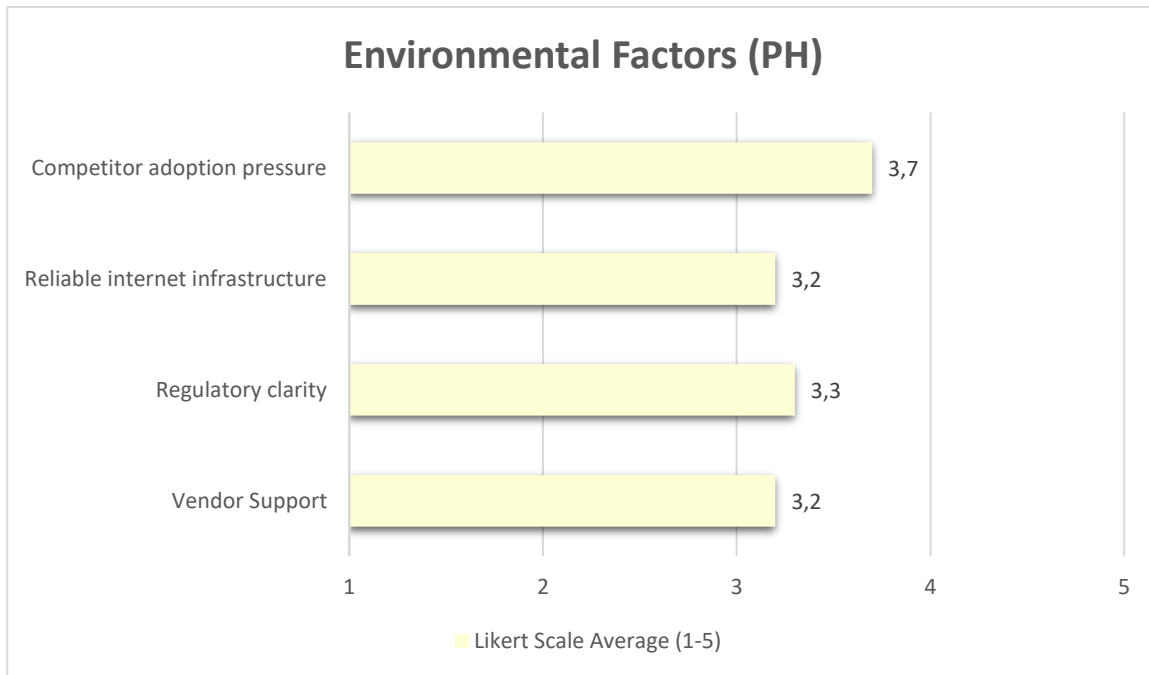


Figure 7. Environmental Factor Ratings in the Philippines (Source: Author's survey, 2025)

Environmental conditions are more challenging for SMEs in Philippines. Although many businesses are aware of industry trends and feel pressured to modernize, they often face inconsistent internet access, particularly in rural or underdeveloped regions. Additionally, despite the existence of laws like the Data Privacy Act of 2012, some respondents may find enforcement weak or guidance lacking, which can discourage broader cloud integration. Vendor support, although available, may not be sufficient to meet the diverse needs of SMEs with limited internal IT capacity.

### Reported Barriers to Adoption (PH)

Among the most frequently reported barriers:

- Security concerns – 20 mentions
- Lack of internal IT skills – 20 mentions
- Internet reliability – 16 mentions
- Cost concerns – 15 mentions

- Regulatory clarity – 10 mentions
- Uncertain return on investment (ROI) – 6 mentions
- Other concerns – 2 mentions

The most prominent barriers reflect infrastructural, technical, and financial limitations. While cloud computing offers flexibility and cost-efficiency, the upfront investment, inconsistent connectivity, and uncertainty about data safety continue to present obstacles for many SMEs in Philippines. These factors are particularly important in regions where digital support and awareness are still evolving. The recurring concern around lack of internal skills further reinforces the need for targeted training and support programs.

### 5.3 Comparative Analysis

This section compares the cloud adoption patterns of SMEs based in Finland and SMEs operating in the Philippines, using the Technology-Organization-Environment (TOE) framework. While both countries demonstrate high adoption rates, the underlying factors and challenges vary significantly due to differences in economic development, digital infrastructure, and institutional maturity.

#### Cloud Adoption Rates

Country	Adopted	Not Adopted	Considering	Total	Adoption Rate
Finland	26	1	1	28	93%
Philippines	28	6	0	34	82%

Table 1. Comparison of Cloud Adoption Status Among SMEs in Finland and the Philippines (Source: Author's survey, 2025)

As shown in Table 1, the cloud adoption rate among SMEs in Finland (93%) is slightly higher than that of SMEs in the Philippines (82%). This aligns with Finland's reputation as a digitally advanced society supported by strong innovation ecosystems and robust infrastructure. While a strong majority of SMEs in the Philippines have also adopted cloud solutions, the country lags slightly behind due to ongoing infrastructure challenges and shortages in digital skills. Notably, no respondents from the Philippines reported being in the "considering" phase, suggesting a more binary adoption process – where businesses either proceed with cloud adoption or refrain entirely, potentially due to perceived risks or a lack of adequate support systems.

### SME Size Distribution

SME Size	Finland	Philippines
Micro	9	8
Small	13	20
Medium	6	6

Table 2. Distribution of SME Sizes Among Respondents in Finland and the Philippines

(Source: Author's survey, 2025)

As shown in Table 2, both samples included a balanced representation of SME sizes, though with some variation. In the Philippines, small enterprises made up the majority of respondents, while the Finnish sample was more evenly distributed across micro, small, and medium-sized firms. This variation may influence adoption dynamics, as small enterprises in the Philippines likely experience greater operational complexity than micro-enterprises but may still face more significant constraints than medium-sized firms. The balanced size distribution in Finland provides broader insight across SME categories and may partially explain the smoother adoption trends observed.

### Technology Factors

Statement	Finland (AVG)	Philippines (AVG)
Improves business efficiency	4.5	4
Compatible with existing systems	4	3.6
Easy to implement	3.9	3.6
Confidence in cloud security	3.9	3.6

Table 3. Comparison of Technology Factor Ratings Between SMEs in Finland and the Philippines

(Source: Author's survey, 2025)

As shown in Table 3, SMEs in Finland rated all technology-related factors more positively than their Philippines counterparts. This likely reflects Finland's mature digital infrastructure and broader exposure to advanced IT systems. In contrast, while SMEs in the Philippines acknowledge the efficiency benefits of cloud computing, their slightly lower ratings – particularly in compatibility, implementation, and security – suggest a degree of hesitation. This may be attributed to infrastructure

limitations, concerns about cloud readiness, and fewer localized cloud success stories that inspire trust and confidence.

### Organizational Factors

Statement	Finland (AVG)	Philippines (AVG)
Top management supports cloud adoption	4.4	3.9
Internal IT expertise	3.9	3.6
Organizational flexibility	4.3	3.9
Availability of cloud training	3.4	3.1

Table 4. Comparison of Organizational Factor Ratings Between SMEs in Finland and the Philippines (Source: Author's survey, 2025)

As shown in Table 4, both groups of SMEs reported strong top management support for cloud adoption. However, SMEs in Finland expressed slightly higher confidence in their internal IT expertise and organizational flexibility. The most notable gap lies in the availability of cloud training, where SMEs in the Philippines reported a significantly lower score compared to their Finnish counterparts. This gap highlights a growing need for structured upskilling and training programs in the Philippines, particularly as the demand for cloud knowledge continues to rise among smaller firms with limited internal resources.

### Environmental Factors

Statement	Finland (AVG)	Philippines (AVG)
Competitor adoption pressure	3.9	3.7
Internet infrastructure supports cloud use	4.6	3.2
Regulatory clarity for cloud computing	3.5	3.3
Vendor support for cloud services	3.6	3.2

Table 5. Comparison of Environmental Factor Ratings Between SMEs in Finland and the Philippines (Source: Author's survey, 2025)

As shown in Table 5, the most notable difference between Finland and the Philippines lies in the quality of internet infrastructure. SMEs in Finland benefit from near-universal high-speed connectivity, removing a key barrier to effective cloud adoption. In contrast, SMEs in the Philippines continue to face challenges with unstable internet access, particularly in rural or less-developed areas, which can hinder consistent use of cloud services. While vendor support and regulatory clarity are rated similarly in both countries, SMEs in the Philippines appear to receive less tailored guidance and fewer institutional resources, which may affect their ability to fully leverage cloud technologies.

### Reported Barriers to Adoption

Barrier	Finland	Philippines
Security concerns	19	20
Lack of internal skills	6	20
Internet reliability	2	16
Cost concerns	7	15
Regulatory clarity	14	10
Uncertain ROI	4	6
Other	5	2

Table 6. Comparison of Barriers to Cloud Adoption Between SMEs in Finland and the Philippines (Source: Author's survey, 2025)

As shown in Table 6, data security concerns were common among SMEs in both countries. However, SMEs in the Philippines face additional structural and skill-related barriers, including limited internal IT expertise and unreliable internet connectivity. These challenges continue to hinder consistent and confident adoption of cloud solutions. Financial limitations also emerged as a more frequent concern in the Philippines, highlighting the pressure on small firms to balance technology investments with operational costs. In contrast, SMEs in Finland expressed more concern about meeting regulatory obligations – particularly in relation to data protection laws like the GDPR – reflecting their more mature compliance environment.

## **Conclusion of Comparison**

The comparative analysis highlights how national context – particularly infrastructure, institutional support, and organizational maturity – significantly influences cloud adoption among SMEs. While both countries recognize the operational benefits of cloud computing, SMEs based in Finland benefit from an enabling environment, while those in the Philippines often must overcome more fundamental challenges. These differences not only affect the rate of adoption but also how cloud services are selected, implemented, and scaled over time.

## 6 Discussion

### 6.1 Interpretation of Findings

This study set out to explore how SMEs in Finland and the Philippines adopt cloud computing, and what factors influence their adoption decisions. The findings confirm that cloud adoption is widespread in both countries, but the underlying motivations, challenges, and enabling conditions differ significantly based on the national and organizational context.

The TOE framework proved highly effective in categorizing these differences:

- Technology factors such as perceived usefulness, compatibility, and ease of implementation were rated positively in both countries. However, SMEs based in Finland scored consistently higher across all technology items, reflecting their stronger digital maturity and greater experience with IT systems.
- Organizational readiness, including top management support, internal IT skills, and training availability, played a crucial role. SMEs based in Finland reported more robust internal support structures, while SMEs in the Philippines showed lower confidence in technical expertise and had less access to formal cloud training. This suggests that while interest in cloud adoption is strong in the Philippines, many SMEs lack the internal capacity to fully leverage its benefits.
- Environmental factors revealed the most striking contrast. While both groups acknowledged competitive pressure and vendor presence, SMEs in the Philippines rated internet reliability and regulatory clarity significantly lower. This aligns with the Institutional Theory, which emphasizes how formal (e.g., laws, infrastructure) and informal (e.g., norms, readiness) institutional elements shape technology adoption. Finland's mature regulatory framework (e.g., GDPR) and strong broadband coverage facilitate confidence in cloud use, while the Philippines still faces infrastructure gaps and regulatory enforcement challenges.

These results reinforce the importance of national context as a moderating variable in cloud adoption. Even when SMEs in both countries see the value of cloud services, external limitations – such as poor connectivity or unclear legal frameworks – can limit adoption or reduce its effectiveness.

### 6.2 Practical Implications

The findings of this study offer several practical implications for SMEs, cloud service providers, and policy makers, particularly in the context of facilitating and improving cloud adoption in both developed and developing country settings.

### **Implications for SMEs**

SMEs in both countries demonstrates awareness of the benefits of cloud computing, especially in terms of efficiency, flexibility, and scalability. However, the extent to which they can capitalize on these benefits depends largely on their internal capacity and external support. In line with previous research (Alshamaila, Papagiannidis and Li, 2013), SMEs with limited IT skills and resources often hesitate to implement advanced technologies due to cost, complexity, and uncertainty.

To address this, SMEs should:

- Invest in digital training for staff to improve internal readiness and reduce reliance on external vendors.
- Consider modular or hybrid solutions tailored to their size and business goals.
- Engage with public-sector or industry-driven digitalization programs that offer financial or technical support (*European Commission, 2020*).

In more digitally mature countries like Finland, SMEs must continue to monitor compliance with regulations such as GDPR and remain vigilant about vendor lock-in and security practices.

### **Implications for Cloud Service Providers**

Service providers have an opportunity to improve SME adoption rates by addressing their unique challenges. Research suggests that vendor support is a critical environmental factor in technology adoption (Tornatzky, Fleischer and Chakrabarti, 1990; Oliveira, Thomas and Espadanal, 2014).

Cloud vendors can support SMEs by:

- Providing localized onboarding support and knowledge-sharing, particularly in regions with limited IT literacy.
- Developing affordable, flexible pricing models suited for SMEs in emerging economies.
- Collaborating with local agencies or government bodies to increase outreach and trust in under-resourced areas (*Marston et al., 2011*).

### **Implications for Policymakers and Institutions**

This study reinforces the role of the institutional environment in shaping technology adoption, as highlighted by Institutional Theory (Scott, 2001). In countries like the Philippines, where infrastructure and enforcement mechanisms are still developing, government action can directly influence cloud readiness among SMEs.

Policy-level recommendations include:

- Expanding broadband infrastructure, particularly in rural or underdeveloped regions.

- Ensuring clear, enforceable data protection policies and providing SMEs with training and resources to achieve compliance (*National Privacy Commission, 2022*).
- Launching or supporting SME digital transformation programs such as cloud vouchers, tax incentives, and public-private partnerships ('OECD', 2021).

For countries like Finland, continued investment in cybersecurity, innovation grants, and SME-focused regulatory guidance will help maintain digital competitiveness and promote the adoption of emerging service models (Erl and Barcelo, 2024).

### **6.3 Limitations of the Study**

While this study provides valuable insights into cloud adoption among SMEs in Finland and the Philippines, several limitations should be acknowledged that may affect the generalizability and depth of the findings.

1. **Sample Size and Distribution** – the survey included a relatively small sample of SME respondents (28 from Finland and 34 from the Philippines). Although the responses offer useful trends, the limited sample size may not fully represent the entire SME population in either country. Additionally, most respondents were from small enterprises, with fewer micro and medium-sized firms, which may skew the interpretation of adoption dynamics by size.
2. **Reliance on Quantitative Data** – the research adopted a quantitative survey method, which provided broad but surface level insights into adoption patterns. While useful for identifying trends, it lacked the depth that qualitative methods – such as interviews or focus groups – could offer in understanding motivations, internal decision-making, or sector-specific challenges.
3. **Self-Reported Data** – the study relies on self-reported data from SME representatives. There is a possibility of response bias, including social desirability bias or misunderstanding of technical terms. This may have led to over or underestimation of certain factors, such as organizational readiness or vendor support.
4. **Sectoral and Regional Variation Not Considered** – The study did not control for industry sectors (e.g., retail vs. manufacturing) or specific regional differences within each country. As cloud adoption can vary significantly based on sector-specific requirements or local infrastructure availability, the absence of this segmentation may limit the precision of the analysis.
5. **Limited Focus on Cloud Service Models or Vendors** – Although the survey captured adoption status and influencing factors, it did not explore which specific cloud service providers (e.g., AWS, Microsoft Azure) or models (e.g., IaaS vs. SaaS) were used. A more detailed investigation could yield deeper insights into usage patterns and vendor preferences.

## 6.4 Future Research Recommendations

This study provides a foundational comparison of cloud computing adoption among SMEs in Finland and the Philippines. However, several opportunities exist for expanding and deepening this research in future studies:

1. **Include Qualitative Research Methods** – Future research could incorporate interviews, case studies, or focus groups to capture contextual and experiential data from SME owners, IT staff, or decision makers. This would help uncover the motivations, challenges, and strategic thinking behind adoption decisions, which are not easily captured through surveys.
2. **Sector-Specific Analysis** – Cloud adoption varies by industry. Studies focusing on specific sectors (e.g., education, healthcare, manufacturing, or logistics) could offer more targeted insights into cloud usage, regulatory needs, and technology fit. This would also help policymakers or vendors design industry-specific strategies.
3. **Longitudinal Studies** – a longitudinal approach could track cloud adoption trends over time, providing a better understanding of post-adoption behaviour, satisfaction, ROI, and evolution of barriers. This would be particularly relevant in emerging markets like the Philippines, where infrastructure and digital literacy are rapidly evolving.
4. **Expand Geographic Scope** – Future research could compare more countries or regions, including other Nordic or Southeast Asian nations, to understand how institutional, cultural, and technological factors interact across diverse environments. This would validate and refine the cross-country comparison model used in this thesis.
5. **Analyse Specific Cloud Models and Providers** – further studies could explore which types of cloud services (IaaS, SaaS, PaaS) are most preferred by SMEs and why. Additionally, analysing adoption patterns related to specific cloud vendors could provide strategic insights for both suppliers and users.
6. **Examine Post-Adoption Outcomes** – There is value in understanding how cloud adoption impacts SME performance – including cost savings, customer satisfaction, innovation, or resilience. Future work could explore whether the anticipated benefits are realized, and under what conditions.

By addressing these areas, future research can contribute to a more nuanced understanding of SME cloud adoption and provide actionable insights for academics, practitioners, and policymakers alike.

## 7 Conclusion

This thesis explored the adoption of cloud computing among SMEs in Finland and the Philippines, with a focus on identifying the factors that influence adoption decisions. By employing the TOE framework, supported by Institutional Theory, the research aimed to provide a comparative understanding of how national context, organizational capacity, and environmental conditions shape cloud adoption behaviour.

The study used a quantitative approach, collecting data through an online survey distributed to SME respondents in both countries. The results revealed that while cloud adoption is widespread in both contexts, Finnish SMEs benefit from more favourable institutional support, higher internal readiness, and more robust digital infrastructure. In contrast, SMEs in the Philippines face significant challenges related to internet connectivity, lack of internal IT expertise, and regulatory ambiguity, despite showing high interest in cloud technologies.

Key drivers of adoption across both countries included perceived improvements in business efficiency, management support, and competitive pressure. However, barriers such as data security concerns, insufficient training, and unclear cloud-related regulations remain critical obstacles – particularly in emerging markets like the Philippines.

The practical implications of the findings point to the need for targeted support from governments, cloud service providers, and SME leaders. Recommendations include investing in training, enhancing internet infrastructure, tailoring vendor support to SME needs, and developing clearer policy frameworks to foster trust and clarity in cloud adoption.

Although the study presents meaningful insights, it is limited by its sample size, reliance on self-reported data, and lack of sector-specific or longitudinal analysis. Future research is encouraged to explore these areas further, using mixed methods or expanding the geographic and industry scope.

In summary, this thesis highlights that cloud adoption in SMEs is not only a technological decision but also a function of organizational capabilities and institutional context. By addressing both internal and external barriers, stakeholders can better support SMEs in leveraging cloud technologies to drive innovation, competitiveness, and growth in an increasingly digital economy.

## Sources

Alharbi, S.T. (2014) 'Trust and acceptance of cloud computing: A revised UTAUT model', *Proceedings - 2014 International Conference on Computational Science and Computational Intelligence, CSCI 2014*, 2, pp. 131–134. Available at: <https://doi.org/10.1109/CSCI.2014.107>.

Alshamaila, Y., Papagiannidis, S. and Li, F. (2013) 'Cloud computing adoption by SMEs in the north east of England: A multi-perspective framework', *Journal of Enterprise Information Management*, 26(3), pp. 250–275. Available at: <https://doi.org/10.1108/17410391311325225/FULL/XML>.

Armbrust, M. *et al.* (2010) 'A View of Cloud Computing Clearing the clouds away from the true potential and obstacles posed by this computing capability', *CommuniCAtionS of thE ACm*, 53(4). Available at: <https://doi.org/10.1145/1721654.1721672>.

Buyya, R., Vecchiola, Christian. and Selvi, S.Thamarai. (2013) *Mastering Cloud Computing: Foundations and Applications Programming*. Morgan Kaufmann.

*Department of Trade and Industry Philippines* (2021). Available at: <https://www.dti.gov.ph/> (Accessed: 22 March 2025).

Erl, Thomas. and Barcelo, Eric. (2024) *Cloud computing : concepts, technology, security & architecture*. Second edition. Hoboken : Pearson (The Pearson digital enterprise series from Thomas Erl).

*European Commission* (2020). Available at: [https://commission.europa.eu/index\\_en](https://commission.europa.eu/index_en) (Accessed: 22 March 2025).

Low, C., Chen, Y. and Wu, M. (2011) 'Understanding the determinants of cloud computing adoption', *Industrial Management and Data Systems*, 111(7), pp. 1006–1023. Available at: <https://doi.org/10.1108/02635571111161262/FULL/XML>.

Mahmood, Zaigham. and Richard, Hill. (eds) (2011) *Cloud Computing for Enterprise Architectures*. Springer.

Marston, S.R. *et al.* (2011) 'Cloud Computing: The Business Perspective', *SSRN Electronic Journal* [Preprint]. Available at: <https://doi.org/10.2139/SSRN.1413545>.

Mell, P. and Grance, T. (2011) 'The NIST Definition of Cloud Computing Recommendations of the National Institute of Standards and Technology'. Available at: <https://doi.org/10.6028/NIST.SP.800-145>.

*National Privacy Commission* (2022). Available at: <https://privacy.gov.ph/> (Accessed: 22 March 2025).

'OECD' (2021). Available at: <https://doi.org/10.1787/BDB9256A-EN>.

Oliveira, T., Thomas, M. and Espadanal, M. (2014) 'Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors', *Information & Management*, 51(5), pp. 497–510. Available at: <https://doi.org/10.1016/J.IM.2014.03.006>.

Pakkanen, Kaisla. (2020) *Factors affecting cloud adoption and its success in Finnish organizations | BearingPoint Finland*. Available at: <https://www.bearingpoint.com/en-fi/insights-events/insights/factors-affecting-cloud-adoption-and-its-success-in-finnish-organizations/> (Accessed: 10 March 2025).

*Philippines - Digital Economy* (2024). Available at: <https://www.trade.gov/country-commercial-guides/philippines-digital-economy> (Accessed: 6 April 2025).

Rogers, E.M. (2003) 'Diffusion of Innovations, 5th Edition Everett M. Rogers', pp. 1–576.

Scott, W.Richard. (2001) 'Institutions and Organizations', p. 255.

Telecommunication Union, I. (2021) 'Measuring digital development - Facts and figures 2021'.

T.King, T.Kai. (2013) *Cloud computing adoption among Philippines SMEs: Determinants and implications for promoting ICT as an enabler*. De La Salle University.

Tornatzky, L.G., Fleischer, M. and Chakrabarti, A.K. (1990) *The Processes of Technological Innovation*.

Venkatesh, V. *et al.* (2003) 'User acceptance of information technology: Toward a unified view', *MIS Quarterly: Management Information Systems*, 27(3), pp. 425–478. Available at: <https://doi.org/10.2307/30036540>.

## Appendices

### Appendix 1. Survey Questionnaire

#### SMEs Cloud Adoption Survey: Finland vs Philippines

Thank you for taking the time to participate in this study. This survey is part of a bachelor's thesis titled "*Cloud Adoption in SMEs: A Comparative Study Between Finland and Philippines*", conducted as part of the Bachelor of Business Information Technology program at Haaga-Helia University of Applied Sciences. The purpose of this survey is to understand how small and medium-sized enterprises (SMEs) in Finland and the Philippines are adopting cloud computing technologies. It explores the factors that influence adoption, including technological readiness, organizational capabilities, and the business environment.

#### Who should participate?

SME owners, managers, IT staff, or those involved in decision-making or use of cloud services in their organization.

#### How long will it take?

The survey will take approximately 5-7 minutes to complete. All responses will remain anonymous and confidential, and data will be used strictly for academic purposes.

Your insights are highly valuable and will contribute to better understanding of cloud adoption practices across different national contexts.

#### Section 1: General Information

1. Which country are you currently working in?

Finland

Philippines

2. What is your position in the company?

Owner

Manager

IT Staff

Other: \_\_\_\_\_

3. What is your company size?

*Options were shown based on the selected country*

**Finland:**

- Micro – not exceeding €2 million in assets or revenue and fewer than 10 employees
- Small – not exceeding €10 million in assets or revenue and fewer than 50 employees
- Medium – not exceeding €43 million in assets or €50 million in revenue and fewer than 250 employees

**Philippines:**

- Micro – up to PHP 3 million in assets and 1-9 employees
- Small – PHP 3-15 million in assets and 10-99 employees
- Medium – PHP 15-100 million in assets and 100-199 employees

4. Has your company adopted cloud computing services?

- Yes
- No
- Currently considering

5. (If answered "No" to Q4) What are the reasons your company has not adopted cloud computing? (Select all that apply)

- We are not familiar with cloud computing
- Security or data privacy concerns
- Poor internet connectivity
- Costs are too high
- We don't have the technical skills
- We don't see a need for it
- Other (please specify): \_\_\_\_\_

6. What is your company's expected use of cloud services in the next 12 months?

- We plan to expand our use
- We will continue using at the same level
- We may reduce our use
- We are considering to stop using it

**Section 2: Cloud Usage**

7. Which cloud services are you currently using? (Select all that apply)

- Infrastructure as a Service (IaaS) – e.g., AWS EC2, Microsoft Azure Virtual Machines
- Platform as a Service (PaaS) – e.g., Google App Engine, AWS Elastic Beanstalk

- Software as a Service (SaaS) – e.g., Microsoft 365, Google Workspace, Dropbox
- Function as a Service (FaaS) – e.g., AWS Lambda, Google Cloud Functions
- Database as a Service (DbaaS) – e.g., Amazon RDS, Firebase Realtime Database
- Other (Please specify): \_\_\_\_\_

8. What is your primary purpose for using cloud services? (*Select all that apply*)

- Data Storage
- Collaboration Tools
- Hosting Apps
- Business continuity or disaster recovery
- Other: \_\_\_\_\_

**Section 3: Adoption Factors** (*Likert Scale: 1 = Strongly Disagree, 5 = Strongly Agree*)

9. Technology Factors

- Cloud computing improves business efficiency.
- Cloud solutions are compatible with our existing systems.
- Cloud technology is easy to implement.
- I feel confident in the security of cloud based services.

10. Organizational Factors

- Our top management supports cloud adoption.
- Our company has the internal IT expertise to manage cloud services.
- Our company's size allows flexibility in adopting new technologies.
- Our company provides cloud training for staff when needed.

11. Environmental Factors

- Our competitors are adopting cloud technologies.
- Local internet infrastructure supports reliable cloud use.
- Our country has clear rules or laws for cloud computing.
- Our company receives sufficient support from cloud service vendors.

**Section 4: Challenges and Institutional Support**

12. What are the biggest challenges your company faces in adopting cloud computing?  
(*Select all that apply*)

- Security concerns
- Internet reliability

- Lack of skills
- Cost concerns
- Lack of regulatory clarity
- Uncertain return of investment
- Other: \_\_\_\_\_

13. National and Institutional Support (*Likert Scale: 1 = Strongly Disagree, 5 = Strongly Agree*)

- Our government provides support that encourages SMEs like ours to use cloud services.
- Our area has good internet infrastructure for using cloud services.
- National data protection laws make our company feel safe using cloud services.
- Our company receives help such as training, incentives, or programs that promote cloud use in SMEs.

14. **Open Feedback (Optional)**

Do you have any additional comments on your company's experience with cloud computing?

---