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SAAS, IAAS AND PAAS: CLOUD-COMPUTING IN SUPPLY CHAIN MANAGEMENT

Case study of Food Service LTD

Business Economics
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ABSTRACT

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The research problem concerns the company's problems and challenges in adopting cloud computing in their potential business strategies. The study objectives are to comprehend the primary elements, both positive and negative, affecting the small business when adopting cloud computing.

The literature review presents the concept of cloud computing, cloud services as well as deployment models, while giving an overview of supply chain management theories. The study methodology is the Qualitative method, and the data collection method is to obtain the answers from the survey and analyze the data according to the TOE framework.

According to the case study, the major reasons for innovation for Food Service Ltd are the flexibility of employing just the resources required at all times, as well as the mobility gained, as data can be accessed from wherever it is needed and with whatever hardware is available. As a result, the company has gained a lot much success in adopting the cloud computing.

Keywords Cloud computing, deployment models, supply chain management, adoption.

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1 INTRODUCTION

In this chapter, an overview of the background of the research will be presented. The background is included the theory related to supply chain management, cloud computing and business model characteristics. Following are the research objectives and some research questions which are relevant to the research and comprehensive study. Finally, the research problem will be discussed and analyzed, and the thesis structure will be illustrated.

1.1 Background

The word “Cloud” is becoming more popular not only in the IT industry but also in the Business industry. It is very commonly used in daily life in words such as Cloud Drive, Cloud Database, Cloud Server, Cloud Security or Cloud Ecosystem. Moreover, in the supply chain cooperation and infrastructure, cloud computing enables more flexible outsourcing of software demands (Harshala et al., 2014).

Nowadays, cloud computing has facilitated the development of new and creative business models on both the provider and consumer sides (Marston et al., 2011). A business model is a system which consists of a collection of components or partial models to present, apply, develop and assess a company’s business strategy (Veit et al, 2014). This construct is defined as an intermediate between a company’s strategy and business operations, and it is also based on the fundamental ideas such as the resource-based perspective and the strategy network theory. Moreover, in the industry, the business model has played a key role in explaining disparities in firm success and how it is promoted by a business strategy (Lambert et al, 2013).

Many businesses reply on an efficient supply chain systems. Supply chain management affects operational procedures, divergent and integrated information flows, and interactions with a wide range of business partners. Recently, efforts have often dealt with the variety by developing and coordinating central information system solutions. Considering, all of the well-known issues with the central information systems, the question arises whether cloud-based

information systems offer a superior choice for establishing an IT support for supply chain management (Harshala et al., 2014). Because of those reasons, cloud computing is significantly affected in the supply chain systems, needed to develop as well as evaluated by the firms.

1.2 Research Objectives

The definition of a research objective is an obvious and demonstrative statement that offers a directive method to analyze the variables as well as summarize the outcome expectations of a research study (SOAS, 2021). Furthermore, a research objective is essential in a research paper in order to get the desired outcome (Jaikumar, 2018).

This research implementation aims to understand the concept of cloud computing in supply chain management, the characteristics of cloud computing, how the business adopts cloud computing in their strategy and the most important factors in cloud computing that have impact on supply chain management. Because of adopting cloud computing, businesses may focus on their core competencies rather than how to construct, operate, and manage their computational infrastructure.

In this study, the adoption and using the cloud computing in Food Service Ltd would be a specific case to be examined and might contribute to the development of business strategy. Furthermore, implementing and adopting cloud computing would help the company to focus more on their business instead of how to maintain and manage their business computational infrastructure.

1.3 Research Problem

A research problem is a statement that presents a topic under examination, a condition that needs to be improved or a vexing question that has gone unanswered in the literature (Bwisa, 2018). To be more specific, a study topic would demonstrate the necessity and need for critical comprehension and conscious investigation. Moreover, the research paper may be driven and targeted

in-depth level with the presentation of the research topic, and it describes the research process and offers the straight path for the inquiry (Tom, 2021).

We are currently living in the 4.0 digitalize world. To increase communication, data, information, and document sharing between customers and suppliers, adequate and effective information and communication technology (ICT) is required (Evelin, 2011). Cloud computing allows customers to rent IT infrastructure, platform, and software services as required. Cloud customers can build business apps, store data, and execute analysis over the Internet on a pay-per-use basis (Chang, Walters et al. 2013).

The global trend, over the last two years, has been developed in clouding market and made this technology affordable to everyone. Cloud computing is still in its infancy, although expanding at a breakneck rate, it is difficult to anticipate how and where it will evolve, even in the near future. Furthermore, we have seen tremendous cost reductions, mostly as a result of the large companies, such as Oracle, Amazon, Google, and Dropbox, increasing the market and, in particular, their market dominance. Therefore, it is tendency for companies to understand and adopt cloud computing into their business strategy.

For this purpose, this study will analyze and answer on the following questions:

- What are the main drivers to the adoption of cloud computing for a specific small sized company?
- What are the main challenges toward the adoption process for the company?
- Should the company adopt the Cloud Computing?

1.4 Thesis Structure

The research paper will be divided into six chapters and references, which consists of:

- Introduction
- Food Service Ltd as a Case study

- Literature review
- Methodology of the study
- Empirical findings
- Conclusions and Recommendations

In the first chapter, it includes the introduction of the thesis, presenting the background, the problem of the thesis, the theory of supply chain management and cloud computing and the impact of adopting cloud computing in supply chain management. In the next chapter, it will be presented an overview information on the company as a significant case study for the research descriptions. After that, the third chapter will highlight on the key concepts related to cloud computing in supply chain management and the frameworks are used to motivate and analyze the business model. The research method will be explained in the fourth chapter in order to define the investigation method, illustrate how to collect and integrate data as well as analyze research data. Finally, in the last chapter, empirical findings, conclusions and recommendations will be presented to demonstrate the concrete figures and further suggestions based on the analysis of the research.

2 FOOD SERVICE LTD AS A CASE STUDY

2.1 Company Information

Food Service was founded in 2006 and has been successfully operating in Georgia market (Food Service LTD, 2021). The company is one of the most important distributors and logistics companies in the Georgia market. The primary operations of the firm include the growth of local food production, procurement, distribution, and logistics, as well as the importation of food items from different countries (Food Service LTD, 2021).

The company's goods and services are available across Georgia. Food Service offers warehouses in several parts of Georgia that meet contemporary market trends and needs. The company's central stock has a 7500 m2 space and is used to store dry goods. Under addition, there is a refrigerator dedicated to items that must be stored at a specific temperature in dry or frozen circumstances. The temperature regime is always protected: +8°C to +10°C for dry items and -25°C for frozen products. The warehouse operates on a semi-automated system and includes contemporary technology for reloading and other operations necessary for a successful operation (Food Service LTD, 2021).

To increase sales training and activities, the firm has its own trainer and strives to develop in this area as well. They have almost 6000 retail partners, and the level of service they give is improving. According to Food Service, the major goals are to offer the best route, revision, and time check on items as they travel to their final destination (Food Service LTD, 2021).

2.2 Company Structure

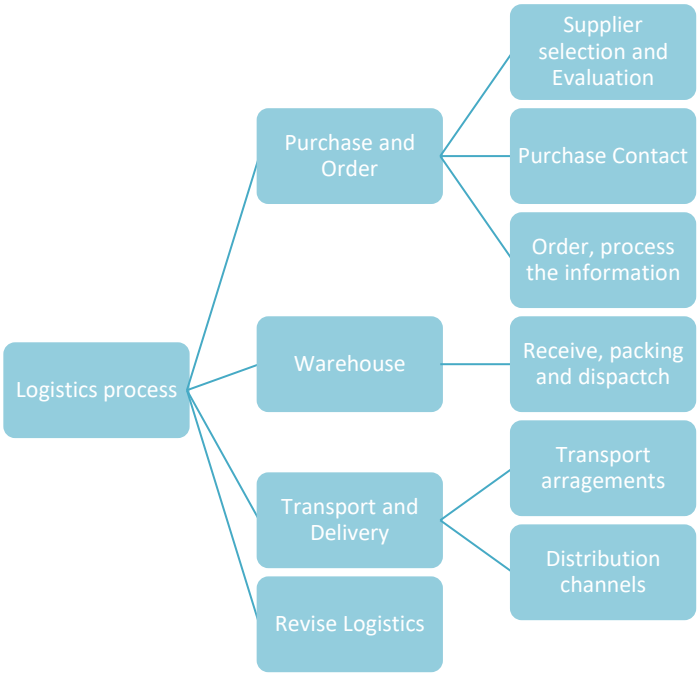

Figure 1: Company's logistics process

Figure 1 shows the logistic process of the company:

The company's structure, as shown in Figure 1, is divided into many parts. The first and most important needs for operating are purchasing and ordering, which refer to the whole purchasing procedure. The primary goal of this activity is to:

- Provide materials to suppliers and essential services to the organization
- Minimize inventory and investment costs
- Maintain high quality standards
- Find vendors for component goods
- Improve the company's competitive advantage
- Maintain long-term relationships with client

3 LITERATURE REVIEW

3.1 Supply Chain Management

3.1.1 Supply Chain Defined

A supply chain is a sequence of decision-making and execution processes and flows of material, information, and money that aims to meet customer requirements and take place within and between different stages of the supply chain (Chopra and Meindl, 2001). A supply chain begins with the distribution of raw materials from a supplier to manufacturer and concludes with the delivery of the finished product or service to the end customer (Jason, 2021). Moreover, the supply chain includes not only the manufacturer, suppliers but also carriers, warehouses, retailers, and consumers themselves (Chopra and Meindl, 2001).

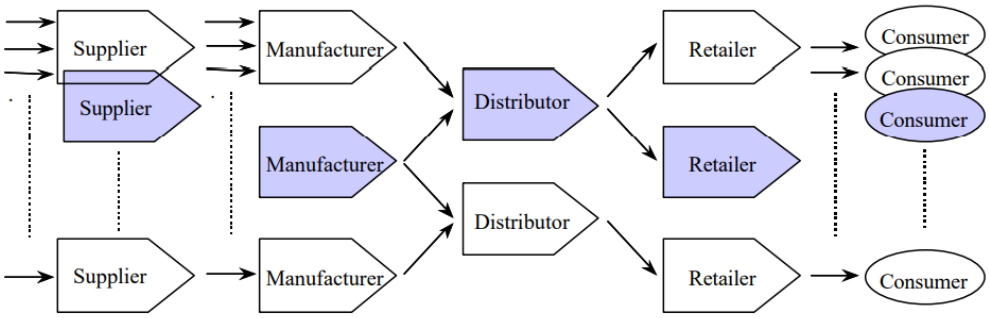

Figure 2: Supply Chain Network

In Figure 2, it shows a generic supply chain in the context of the entire supply chain network. Every company belongs to at least one supply chain which typically has several suppliers and customers.

The cycle view is the traditional way of looking at a supply chain (Chopra and Meindl, 2001). According to this viewpoint, supply chain processes are divided into a series of cycles, each of which is performed at the interface between two successive stages of a supply chain. This means that each cycle is independent of the others. The cycles through an inventory so that it can function independently, optimize its own processes, and is not dependent on others. Hampered by “issues”

in other cycles, for instance, consider a cycle that replenished retailer inventories by delivering products from the manufacturer's end-product inventory and a cycle that handles replenishing the manufacturer's inventory through the production of new end-products (Jack, 2004).

3.1.2 Supply Chain Management Defined

The term "supply chain management" is a new one and first appeared in logistics literature in 1982 as an inventory management approach focused on the raw material supply (Oliver and Webber, 1982). To clarify, around 1990, academics first described "supply chain management" from a theoretical standpoint how it differed from more traditional approaches to material flow management and the associated information flow (Cooper and Ellram, 1993).

The supply chain includes all activities and information relevant to the flow of goods from the raw material to the delivery of the goods to the end consumer. Supply chain management (SCM) is the management flow of materials, information, and finances as it goes through a process from supplier to manufacture, from wholesaler to retailer and consumer. It is said that the ultimate goal of any effective supply chain management system is to reduce inventory levels, as a solution for a successful supply chain management, sophisticated software systems with web interfaces are available and promise to provide the best part for all supply chain management services to companies that lease their service. Moreover, supply chain management flow can be divided into three main flows, which are the product flow comprises the movement of goods from the supplier to the customer as well as the customer returns; the service requests include the transmission of orders and the update of the delivery status and the cash flow consists of loan terms, payment schedules, and ownership transfer and ownership agreements (Harshala et al., 2014).

The recognition that sub-optimization occurs when each organization in supply chain attempts to optimize its own results rather than integrating its goals and

activities with other organizations to optimize the chain's results is a driving force behind SCM (Cooper et al., 1997).

The conceptual framework emphasizes the interconnected nature of SCM and the need to design and successfully manage a supply chain in several steps. Each step is directly related to supply chain objectives, i.e. how well a supply chain meets end-user requirements for key performance indicators at any point in time and at what total cost. Key Performance Indicators (KPIs) are a small number of critical dimensions that contribute more than proportionally to market success or failure (Martin, 2011).

KPIs compare a system's efficiency and/or effectiveness to a norm or target value. A well-defined set of supply chain performance indicators will help benchmark and evaluate changes over time (Jack, 2004).

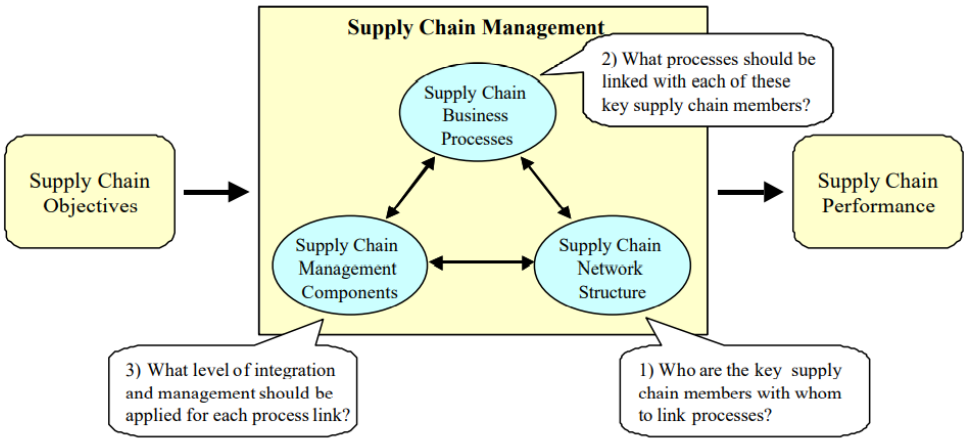

Figure 3: Key decisions in Supply Chain Management

Figure 3: Key decisions in Supply Chain Management (Lamber and Cooper, 2000).

3.1.3 Business Models

Peter F. Drucker offered the following important issues for analyzing and designing business models in 1954: — (1.) What is our line of business? (2.) Who is the client? (3.) What is the customer's value? (4.) What will our line of business be? (5.) How should it be phrased? (1954). Furthermore, Morris et al. (2005)'s concept of a

business model is still in use today: A business model is a succinct depiction of how an interconnected collection of decision factors in the areas of venture strategy, architecture, and economics are addressed in order to achieve long-term competitive advantage in defined markets.

Pateli and Giaglis (2004) separate seven additional areas of business model research that are important to our work in addition to the concept of business models: 1) Components/fundamental constructions, 2) Taxonomies, which are used to categorize business models, 3) Conceptual models, 4) Design techniques and tools, 5) Adoption factors, 6) Evaluation models, and 7) Change procedures.

Models Reference	**Definition**
Amit and Zott, 2001	A business model portrays the content, structure, and governance of transactions meant to produce value by capitalizing on business possibilities.
Osterwalder et al., 2005	A business model is a conceptual tool that contains a set of objects, concepts, and their interactions with each other to explain the business logic of a certain enterprise.
Timmers, 1998	A business model is defined as follows: - An architecture for the product, service, and information flows, including a description of the various business actors and their roles; and - A description of the potential benefits for the various business actors; and - A description of the revenue sources.

Table 1: Business Models

3.2 Cloud Computing

3.2.1 History of Cloud Computing

To understand cloud computing, the history and evolution of the technology should be discussed. The word “Cloud” returns to the 1950s, when the mainframe computer was considered the future of computing, becoming extremely trendy in academics and companies. However, due to a lack of internal processing capacity and client computer access, a proposal was made to allow many users to share physical access to the computer as well as CPU time through various terminals (Yang, 2015). Furthermore, according to Strachey, in the industry, this is referred to as time-sharing and thus, the rudimentary form of “Cloud” was born (1959).

Salesforce.com pioneered the notion of software as a service by delivering services to corporations through their own website in 1999. Amazon developed Amazon Web Services (AWS) in 2002, a suite of services that includes storage, compute, and others. Furthermore, Amazon introduced Elastic Compute Cloud (EC2) to small business and consumers in 2006, allowing them to operate their own computer programs in the cloud. Eucalyptus, the first open-source AWS API compliant technology for constructing private clouds, was released in 2008. Google Apps, a browser-based corporate application service, was launched in 2009 (Albert, 2011).

Cloud computing is the culmination of a 15-year trend toward the industrialization of information technology. Moreover, due to the increasing popularity of outsourcing and hosting in industrialized services, there is an increasing in-service definition, cost structures and pricing. The ongoing standardization of underlying technologies such as virtualization, service-oriented architecture (SOA), and Web 2.0 enables the cloud computing model. This has resulted in a dramatic increase in the popularity and use of both the general Internet and corporate-wide intranets as reliable delivery models for business services. Furthermore, the technologies used for cloud computing have enabled the delivery of IT services in

a cost-effective and pervasive manner. Therefore, the transition encompasses fundamental concepts such as just-in-time, pay-per-use, abstracted and simplified resources, federation, and composite applications and services. Customers are pushing for lower costs, greater availability and agility, and risk management, all of which are being accelerated by the current global recession (Sam, 2010).

3.2.2 Cloud Defined

More specifically, the term "cloud computing" refers to a type of computing in which dynamically scalable resources are provided as a service via internet technologies. These cloud services are typically provided through a pay-as-you-go business model, with service types including system and security infrastructure, application infrastructure, information, application, and business process. This model enables you to consume services more effectively in the context of business policy (Sam, 2010).

Clouds are classified into three types: internal, external, and hybrid. An internal cloud is built on a pool of shared resources (whether mainframe, distributed, or virtualized) that are only accessible within organizational boundaries. The resources are accessed via a private and secure intranet, and they are all owned and controlled by the company's IT department. Essentially, the cloud computing business model is brought in-house and managed to enable shared IT services. An external cloud is a domain in which cloud services are obtained via the public Internet. The resources that comprise those services are owned by the cloud service providers. Salesforce.com, Google App Engine, and Google Search, Microsoft Azure, and Amazon's plethora of Web services, such as EC2, are a few examples. A hybrid cloud is a combination of internal and external clouds in which services from each domain are consumed in an integrated fashion and an extended relationship with the selected external service providers is maintained (Sam, 2010).

Internal and external clouds serve as the foundation for a wide range of cloud computing service models. As we can see, the industry has successfully adopted

three types of cloud computing service models. Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS) (Sam, 2010).

Cloud service enablers, also known as cloud enablers, aid in the establishment and maintenance of business model. This can include infrastructure-building technology (e.g., VMware, Citrix Systems, and 3Tera) as well as IT management capabilities (e.g. CA). Cloud enablers might also combine the core offerings of multiple cloud service providers to provide a composite set of applications and services. Cloud enablers are important contributors to cloud computing adoption because they strive to simplify and secure the use of multiple cloud services (Sam, 2010).

As a cloud service consumer, you might also interact with a cloud service procurer in addition to the cloud service provider. This individual, organization, or entity obtains specific cloud services on your behalf. The cloud service procurer can negotiate lower prices and choose the best cloud service(s) to meet your requirements. The service procurer might remind you of a general contractor who subcontracts parts of a project to other companies or individuals while maintaining direct contact with the customer (Sam, 2010).

3.2.3 Cloud Broker

The cloud broker is an unique example of the service procurer. This role is now defined as an organization or entity that establishes and maintains relationships with multiple cloud service providers. This allows customers to access services from multiple providers while maintaining a consistent user experience and requiring minimal configuration. Cloud brokers offer additional services in addition to those offered by cloud service providers. Consolidated billing, seamless switching between cloud computing services, or simultaneous connections to multiple cloud computing services, as well as federated identity management or other added services, may be provided by a cloud broker (Sam, 2010).

In addition, a cloud broker might conduct surveys of cloud service providers to learn about their capabilities, liabilities, business models, and costs. This allows

customers to avoid multiple relationships in favor of forming just one with a cloud broker who understands your specific IT service requirements. In turn, the cloud broker could choose the best cloud services for the IT organization and monitor them on its behalf. A cloud broker will save money and allow to better use cloud computing to add value to business (Sam, 2010).

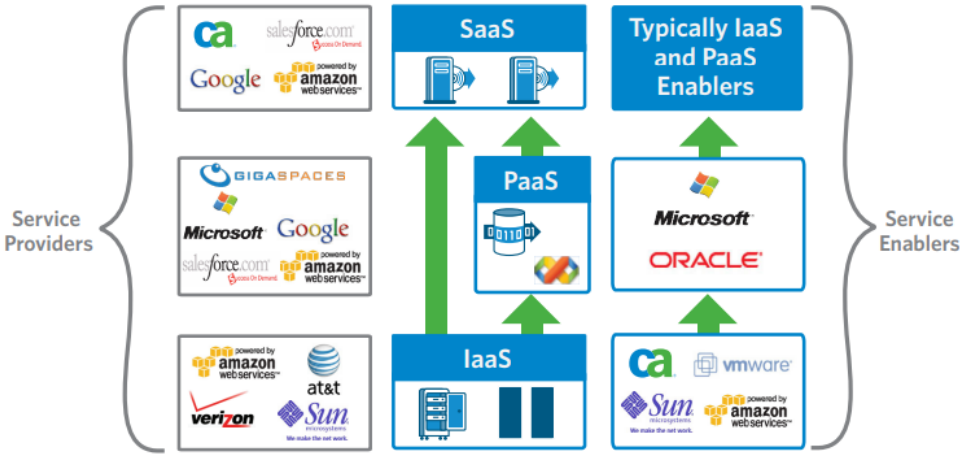

Figure 4: Cloud service models working together

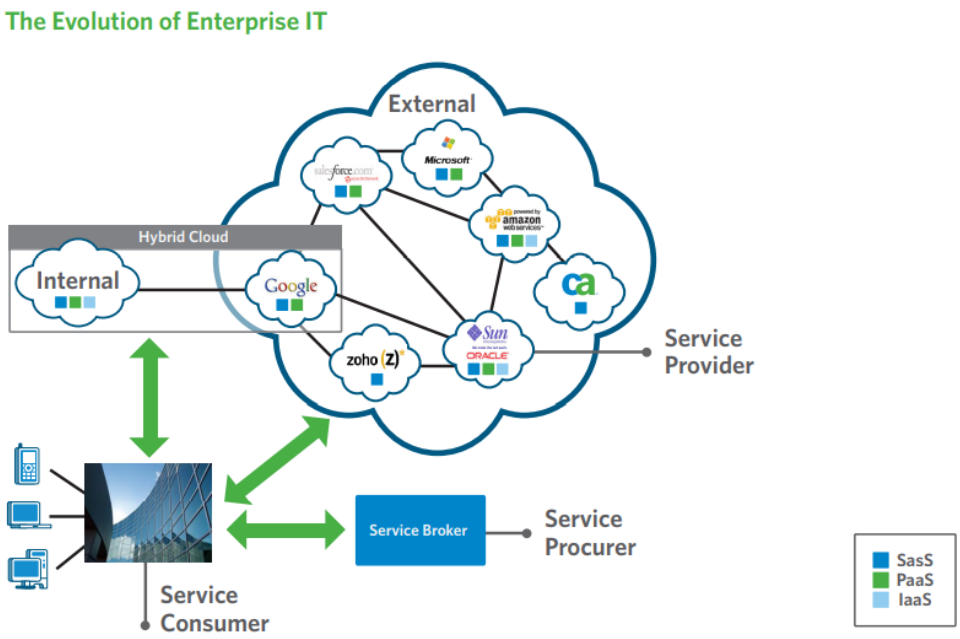

Figure 5: Enterprise IT Infrastructure

Figure 5 shows the enterprise IT Infrastructure becomes a supply chain, consisting of internal and external IaaS, PaaS and SaaS providers.

3.2.4 Cloud Computing in Supply Chain Management

According to Harshala et al., SCM Cloud is "a set of services that provide SCM functions to any cloud user in an efficient, scalable, dependable, and secure manner" (2014). That is, rather than having to deal with the inherent technologies, cloud hides all the heterogeneities involved in implementing various SCM functions and the tiers within each function and provides a purely functional view. The cloud's perspective makes us, the service providers, the best candidates to take the cudgel and implement the CLOUD. As a result, we must prepare a pool of requirements and a pool of plausible technologies, as well as a layer of abstraction, to free the user from selecting packages, best-of-breed solutions, databases, integration middleware, and infrastructure, and instead focus on the required functionality and how much he can/should pay for it. A simplified tiered illustration of SCM cloud components is shown below (Harshala et al., 2014).

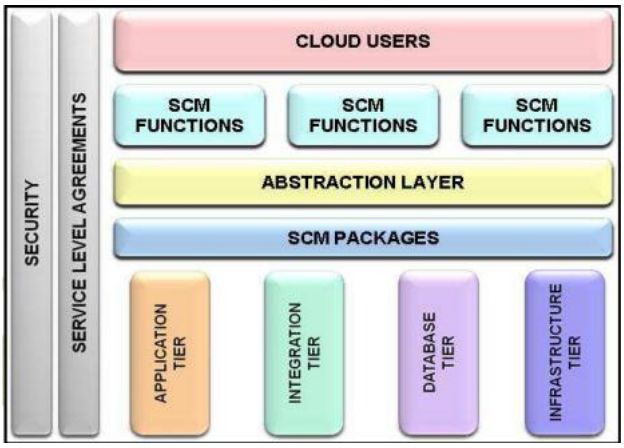

Figure 6: Cloud Computing in SCM

The evolution of cloud computing will have a significant impact on businesses (and their supply chain operations) in several ways: new competitors: cloud computing has the potential to allow startup companies to establish themselves quickly without significant infrastructure investment. This has the potential to have a significant impact on the competitive landscape of many established market leaders. Speed to market for new products and services: In recent years, the rate at which new revenue-generating products and services are introduced has put constant strain on supply chains (Harshala et al, 2014).

Cloud computing will hasten this process even further. Large-scale transformation: the threat of new competition, as well as the increased pace of new product and service introduction, may force traditional, infrastructure-intensive supply chains to reinvent themselves. Supply chains will almost certainly become more dynamic, scalable, and capable of supporting the financial goals of boards and shareholders (Harshala et al, 2014).

Cloud computing has a significant impact on the supply chain management application market, and adoption is expected to increase in the coming years. Companies that provide SCM software applications – such as e-procurement, warehouse management systems, transportation management systems, supply chain planning, and business intelligence and analytics – are either already offering ‘software as a service' (cloud-based) solutions or have a clear strategy in place to transition to such solutions as more customers demand it (Harshala et al, 2014).

3.2.5 Impact of Cloud Computing on Supply Chain Management

Generally, supply chain planning; warehouse and manufacturing management applications have lower SaaS adoption rates, especially in large enterprises supply chain execution applications such as transportation management systems and global trade management have higher adoption rates, but installations are still the most common deployment model, especially for large enterprises or companies with complex requirements. Acquisition applications are widely adopted, but there have noticed differences between applications that support direct materials and applications that support indirect materials. It is suitable for SCM for the following reasons (Harshala et al, 2014):

Cost

- It offers an inexpensive way to acquire SCM functionality.
- Bypasses IT resource and budget constraints.
- Supports low-cost, highly distributed operating processes if the SaaS provider has already established
- Integration with supply chain partners.
- Lower acquisition costs.

Speed

- Typically, results in a shorter time to deployment.
- ROI may be recognized or demonstrated more quickly.
- Avoids the delays that come with long IT project queues.
- Time to market is reduced for simple to moderate requirements.
- New features will be released more quickly.

Business value

- Enable SCM in small and medium-sized businesses.
- Develop Skills Before Investing.
- Tests the application of the provider in a proof of concept or pilot project.

- Allows companies to test innovations more cheaply, with no long-term commitments.
- Improves agility to continuously respond to user requests.
- Often improves usability.

The goal of installing supply chain management software

Before the Internet, the goals of installing supply chain software were limited to improve their ability to predict customer demand and make their own supply chains run more smoothly. However, the Internet's low cost and pervasiveness, combined with its simple, usually accepted communication standards, has thrown the door wide open. Companies can now connect their supply chain to their suppliers and customers, forming a single vast network that optimizes costs and opportunities for all parties. This was the inspiration for the concept of connecting everyone with whom a company does business into one big happy, cooperative family. Although the reality isn't always so cheerful and cooperative, most businesses now are able to share at least some data with their supply chain partners (Harshala et al, 2014).

3.2.6 Cloud Services Models

Cloud systems are divided into five levels, according to Youseff et al. (2008): cloud application layer, cloud software environment layer, cloud software infrastructure layer, software kernel, and hardware and firmware. Using this process and concept of service-oriented architecture, Youseff et al. proved that each layer may be built from the ones beneath it (SOA) (2008). For instance, cloud applications might be developed by integrating services from the software environment layer and the infrastructure layer (Grossman, 2009). The most well-known delivery model categorization accessible in academics is dividing cloud services into software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS) (Michael et al., 2020).

SaaS – Software-as-a-Service

Software-as-a-service is a service in which the original creation of software and applications takes occur on platforms offered by the PaaS layer (Amit et al., 2015). SaaS is primarily concerned with end-user platforms since end-users may use and access cloud providers' built apps. Customers do not need to purchase or install software in their own data centers; instead, they may use it from the cloud via SaaS. A software provider licenses a software program to be used and bought on demand under the SaaS model, and applications may be accessible through network from multiple users (browser, mobile, etc.) by application use. The program offers users with commercial value. The responsibility of managing software and its deployment is delegated to third-party services through SaaS. Based on a set of predefined configuration settings, the program can be changed to the extent for which it was created (Richa, 2015).

IaaS – Infrastructure-as-a-Service

Infrastructure-as-a-service offers computer resources such as storage, servers, and other peripherals as a service. Customers nowadays want to acquire resources rather than set up servers, software, and data center space themselves and be invoiced based on resources spent. Essentially, it supplies raw hardware as well as virtualized infrastructures (Kimmy, 2013). The IaaS model provides a service that allows users to obtain a virtual server in a matter of seconds and only pay for the resources that they user. Furthermore, users can directly access infrastructure components under the IaaS components such as storage, firewall, network, etc. IaaS is a standardized, highly automated product in which computational resources, supported by storage and networking capabilities, are owned and hosted by a service provider and supplied to consumers on-demand (Lalit et al., 2017).

PaaS – Platform-as-a-Service

Platform-as-a-service provides the platform or environment in which developers may build and develop software and apps. The code can be written by the

developers in accordance with the standards of the relevant platform. The PaaS layer is an abstraction layer that sits between the IaaS and SaaS levels (Lalit et al., 2017). In this paradigm, the customer created the application by utilizing tools and/or libraries made available by the platform as a service. The consumer is also in charge of software deployment and configuration (Krishan et al., 2020). The network, servers, storage, and other services required to host the consumer's application are provided by the service provider. PaaS options enable application deployment without the expense and complexity of procuring and managing underlying hardware and software, as well as delivering hosting capabilities (Lalit et al., 2017).

3.2.7 Cloud Deployment Models

Private Cloud

A private cloud is designed for a single customer or business to efficiently control data, security, and service quality. The corporation has infrastructure and manipulates application deployment through it. Private resources are the key benefit of private cloud (Yang, 2015).

A firm or a cloud service provider can set up a private cloud. Cloud service providers such as Sun and IBM are expected to build, configure, and maintain the infrastructure to support the private cloud containing the business datacenter owned by a specific firm based on this hosted management. In this approach, the organization can tightly regulate the use of cloud resources while also gaining expert understanding of establishing and administering this environment (Yang, 2015).

Public Cloud

The term "public cloud" typically refers to the cloud provided by third-party cloud service providers and accessed over the Internet. The price is either low or free. In this manner, a corporation provides its service external customers with direct access to their own infrastructure, and external users use the service over the

Internet without having cloud computing resources. The public cloud has several advantages as well. In comparison to other storage systems, it provides a stable and secure data storage center (Yang, 2015).

Additionally, due to the huge number of users in the public cloud, it is fairly simple to share files or storage with others and access a vast array of public resources. It also connects upstream elements such as adverts and VAS with downstream end users, resulting in the formation of a new value chain and ecosystem (Yang, 2015).

Community Cloud

A community cloud enables numerous independent companies to share nonpublic cloud costs. It is a component of the public cloud that is deployed in a specific geographic region and organized as a community. This methodology has immense promise for businesses or organizations that face similar regulatory, compliance, or legal constraints (Winkler, 2011). Community clouds are typically established in areas where users have similar needs and offer unified services (Yang, 2015).

Hybrid Cloud

A hybrid cloud is a collection of various clouds that exist as separate entities while still being linked together. As previously said, a private cloud is more secure than a public cloud, but a public cloud has a vast array of public resources. As a result, combining a public cloud with a private cloud yields the ideal answer to this conflicting situation: hybrid cloud. It offers private cloud security measures that keep internal essential data in the local datacenter and can also use computing resources from the public cloud to accomplish work efficiently and effectively (Yang, 2015).

Furthermore, it overcomes the hardware limitations of a private cloud by leveraging the extensibility of the public cloud to increase processing capacity. Besides, the cost would be cheaper since it may migrate between public and private clouds based on user requirements, assigning application and data to the most appropriate platform (Yang, 2015).

3.3 Main Frameworks

Clouding is still in its infancy, yet its adoption has enormous potential. The ideas produced thus far are not yet capable of offering a simple grasp of how cloud computing might assist and affect small and medium-sized businesses. Nevertheless, the key stages had already been done, particularly what was important - the construction of a framework. Following that, three major frameworks will be experienced in considerable detail. The TOE framework is the primary framework utilized to examine the research data in this study.

3.3.1 TOE Framework

Hsu et al. states that the Technology, Organization, Environment (TOE) framework is offered to describe the process of innovation in the setting of a company (2014). This framework considers three aspects of a company that have impact on the adoption of innovation: the contexts of technology, organization and environment. The technological context refers to the internal and external technology important to the company, as well as the technologies available for prospective adoption. The organizational context relates to descriptive qualities of the firm (i.e., organizational structure, firm size, management structure, degree of centralization), resources (human and spare resources), and the process of communication (formal and informal) among employees. The environment context includes market aspects, competitors, and the regulatory environment (Oliveira et al., 2014). It has been proposed that innovation is a process of communication that takes place through many channels within the social system. Three elements impact the adoption of innovation in businesses that share the TOE framework idea (Oliveira et al., 2014).

- *Technology*: relative advantage, complexity, and compatibility (Hsu et al., 2014)
- *Organization*: top management support, business size, and technological preparedness (Hsu et al., 2014).

- *Environmental:* factors include competitive pressure and trading partner pressure (Hsu et al., 2014).

W. Wang, Rashid, and Chuang (2011) discussed that cloud computing was significantly trending and they also examined the worldwide degree of development of cloud services and the market. At the time, they were both responsive to one other. On the one hand, the market must encourage enterprises to innovate and enhance their goods, and cloud computing industry must assist companies in understanding the demand for their services (W. Wang et al., 2011). Furthermore, W. Wang et al. evaluate the largest corporations that are the main distributors as significant cloud computing services and suppliers of those services (2011).

Cloud computing might be a good approach for many businesses to secure their data. Organizations also were benefit from the ability to test, implement, and monitor their strategies quickly and efficiently. For example, evaluating a product or service before introducing it is generally expensive and competitive. This means that with pay-per-use, businesses may much more simply adopt a wide range of digital-connected items. Another significant advantage is that it is ideal for businesses with no or few IT personnel. It is much simpler for individuals to overcome this challenge when their information is clouded (Besarion, 2015).

According to Oliveira et al., "cloud computing is an essential progression of information technology." It has appealing characteristics such as agility, scalability, pay-per-use, and cost effectiveness." And their research "sought to uncover the factors of cloud computing adoption based on innovative characteristics and organizational technology, organizational, and environmental settings." A research model that blends the DOI theory with the TOE framework was constructed (2014).

3.3.2 DOI Framework

Diffusion of Innovation theory (DOI) is a key technique to study how a breakthrough technology spreads. DOI theory is concerned with how a new technology breakthrough goes from creation to utilization. It outlines the patterns of adoption, explains the mechanism of diffusion, and aids in forecasting whether and how a new idea will be successful (Oliveira et al., 2014). According to the diffusion of innovation theory, there are two types of elements that impact a firm's adoption of innovations: innovation characteristics and organizational characteristics. The "perceived features of the invention" that either stimulate or restrict innovation usage are factors under the Innovation Characteristics category. It found that five characteristics of an invention (relative benefit, compatibility, complexity, trialability, and observability) may explain 49–87 % of the variation in adoption rate (Rogers, 2003).

While the "Innovation Characteristics" explain a portion of the dissemination of innovation, these findings are based mostly on research at the individual decision-making level (Hsu et al., 2014). According to Oliveira et al., the DOI framework is a popular adoption model in Information Systems (IS) research, containing five characteristics that describe the organization's acceptance of innovation: Relative advantage - the amount to which an invention outperforms the preceding generation; Compatibility - refers to how well an innovation fits into established company procedures, practices, and value systems; Complexity - how difficult it is to put the innovation to use; Observability - the amount to which the invention is visible to others, and Trialability - the ease with which the innovation may be tested. DOI is mostly dependent on the quality of the technology and the consumers' views of the innovation (2014).

DOI, according to Hsu et al., is a method for evaluating how a new technology spread. DOI theory examines the essential aspects in the adoption process, explains the structure of diffusion, and attempts to forecast whether or not a new idea will be successful (2014). This theory proposes two types of elements that impact a company's adoption of new technologies: innovation characteristics and

organizational characteristics. Both of them are influenced by internal forces. According to Rogers, when analyzing the spread of an invention at the organizational level, numerous organizational features have impact on the acceptance of innovations, such as centralization, scale, slack, formalization, and interconnection. (Hsu et al., 2014)

3.3.3 Cloud Computing Business Framework

According to Chang et al. (2013), Cloud Computing Business Framework (CCBF) is described and prepared by the mainstream Cloud Computing frameworks and divided into several recommendations which are:

- A reference model for cloud (RMC) for integrating Cloud Computing and Operations (Chen et al., 2010).
- The IT Infrastructure Library (ITIL) version 3 Service Framework (Adams, Hanna, Cartlidge, Sowerby, & Rance, 2008).
- Service Oriented architecture (Papazoglou and Georgakopoulos, 2003).
- IBM SOA framework (Chen, 2006; IBM Certification, 2010).

Cloud computing is defined as a tower architecture in a reference model. To support high-level cloud services, virtualization serves as the foundation and sits on top of hardware. The third phase is Infrastructure as a Service, followed by Platform as a Service and Software as a Service at the top of the tower (Chen, 2010).

ITIL V3 is a managerial method to IT service management that includes five stages of quality continuous measurement and improvement processes: service strategy, service design, service transition, service operation, and continuous service improvement. The framework's major goal is to deliver 14 continuous improvements in services supplied from both a company and a consumer standpoint (Adams et al., 2008).

Service-Oriented Architecture is a framework for composing and organizing Service-Oriented Computing that consists of four major stages: coordination,

monitoring, conformance, and quality of service (Papazoglou and Georgakopoulos, 2003).

The IBM SOA framework specifies the business process and illustrates the relationships between the business model and IT services delivered through service computing (Chen, 2006). According to Chen, the framework's key benefits include increased efficiency in meeting all business requirements and procedures, better resource management, and the ease of integrating various services and technologies (Chen, 2006).

4 METHODOLOGY OF THE STUDY

The research study will be discussed deeply in the fourth chapter in order to illustrate how the author constructs. Accordingly, the research method, data collection method and data analysis will be presented in this chapter, while the limitations will be explained in the last section.

4.1 Research Method

There are 3 different types of research methods: qualitative research, quantitative research, and pragmatic research (Ilyas 2017). Each research approach performs diverse roles and functions and makes major contributions to the thesis paper in order to attain the desired results. Qualitative research is defined as an unstructured approach that uses transcribed materials, transcriptions of personal conversations, or group interviews to develop insights and knowledge in a study sample (Grossoehme 2014). In comparison, quantitative research may be characterized as a technique that assesses data and employs a variety of statistical examination kinds to study end outcomes and produce perspective (Babbie 2010; Creswell 2009). Besides, Pragmatic research, which is a combination of the two methodologies discussed above, might be an alternative to assist the research paper in accomplishing the objectives.

To answer these issues, I would prefer to conduct a qualitative study using primary data from survey. Then, integrate it into the appropriate framework and draw some inferences based on the results.

4.2 Data Collection Method

According to Kabir, data collection is defined as the process of gathering and assessing information on a certain issue in a research article in order to clarify the stated research questions, test hypotheses, and evaluate the results (2016). In all study aspects, data collecting concentration is recommended to ensure the correctness and integrity accumulation, as accurate data gathering may be a vital influence in preserving the research's accuracy (Kabir 2016; Ayedun-Aluma,

Ajibade & Folayan 2018). By collecting data, the research will be provided with comprehensive quality evidence that can be transformed into data analysis progress, providing reasonable belief that the stated questions will be answered (Kabir 2016).

There are two methods for collecting data: qualitative and quantitative. According to Kabir (2016) and Archer (2018), qualitative data are non-numerical, explanatory, and nominal information that is presented in the scheme of words and phrases to explore correlations and assess the topic investigation. The study will highlight awareness, empathy, and subjective experience of the research plan by employing qualitative data and addressing the "how" and "why" of the subject (Kabir 2016; McLeod 2019).

Quantitative data, on the other hand, is introduced as numerical data and may be analyzed analytically using various scales such as nominal scale, ordinal scale, interval scale, or ratio scale. The goals of quantitative data analysis are to examine the relationships between variables, perform target forecasting, and investigate generalization to larger populations (McLeod 2019).

Furthermore, when it comes to the sources of data used to perform data gathering, there are a variety of options, including primary and secondary data (Mahto 2011). Primary data are said to have a substantial impact on study trustworthiness since it is acquired from sources such as trials, surveys, questionnaires, observations, or private interviews that cannot be manipulated and have high dependability (Kabir 2016; McLeod 2019; Ajayi 2017). Secondary data are defined as data that have already been declared in certain schemes (Ajayi 2017). To obtain secondary data, many sources such as books, records, biographies, newspapers, online articles, online journals, and organization databases are suggested. Secondary data are important and overcome the difficulty of acquiring primary data in specific research scenarios (Kabir 2016).

The primary data were gathered through a survey that were conducted by Food Service representatives. The survey is divided into three sections. The first section

is on the business itself. The second and third sections are about Cloud Computing, and they include questions about the drivers of change, as well as the obstacles and concerns that come with implementing this transformation.

In this study, the TOE framework was used to analyze the research results and drawn the corresponding conclusion and it consists of three different contexts: Technological, Organizational and Environmental.

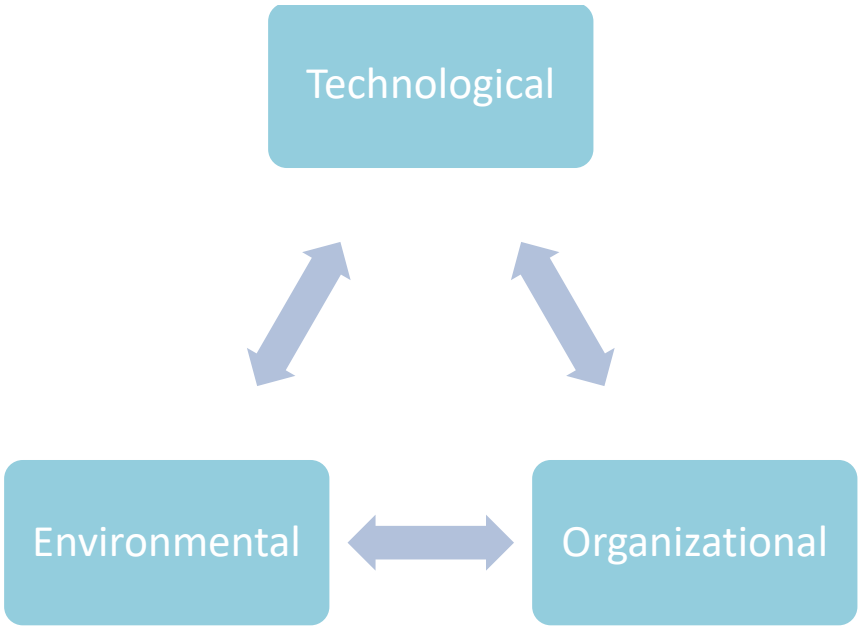

Figure 7: TOE Framework

4.3 Sample Collection

The primary data were a survey and included three different sections:

Section 1: Company

Knowing that experience in IT and cloud computing might be one of the most important variables impacting cloud adoption, it is critical to determine whether such knowledge exists and where it can be obtained.

Section 2: Drivers

The second section discusses the perceived benefits of using cloud services and their attitudes toward them. As a result, the inquiries focus on the types of services and clouds that are used, as well as anything else that is thought noteworthy.

Furthermore, it is critical to understand which areas of the business are using or planning to adopt cloud computing. It will help to understand the most essential elements for adoption and which section of the company is intended to be implemented.

Finally, it is critical to understand the primary benefits that the organization has received or plans to get from cloud computing. A list of the most frequent important criteria is supplied, and each should be graded on a 1 to 5 scale, with 1 being low and 5 being high.

Section 3: Concerns

They are crucial in any choice involving change and could computing adoption is no exception. Some issues must be handled ahead of time, while others will be addressed as they arise. Privacy, availability and integrity of services and/or data, confidentiality, loss of control of services and/or data, lack of liability of providers in case of security incidents, inconsistency between transnational laws and regulations, ambiguity of pay-per-use scheme, concerns about variable costs that can be uncontrolled, cost and difficulty of migration to the cloud (legacy software, etc.) are some of the most common concerns.

4.4 Data Analysis

According to responses, the firm has over 650 employees. Questions were divided into two categories based on the two primary types of characteristics required for study, and they were employed in technological, organizational, and environmental analyses.

4.4.1 Technological context

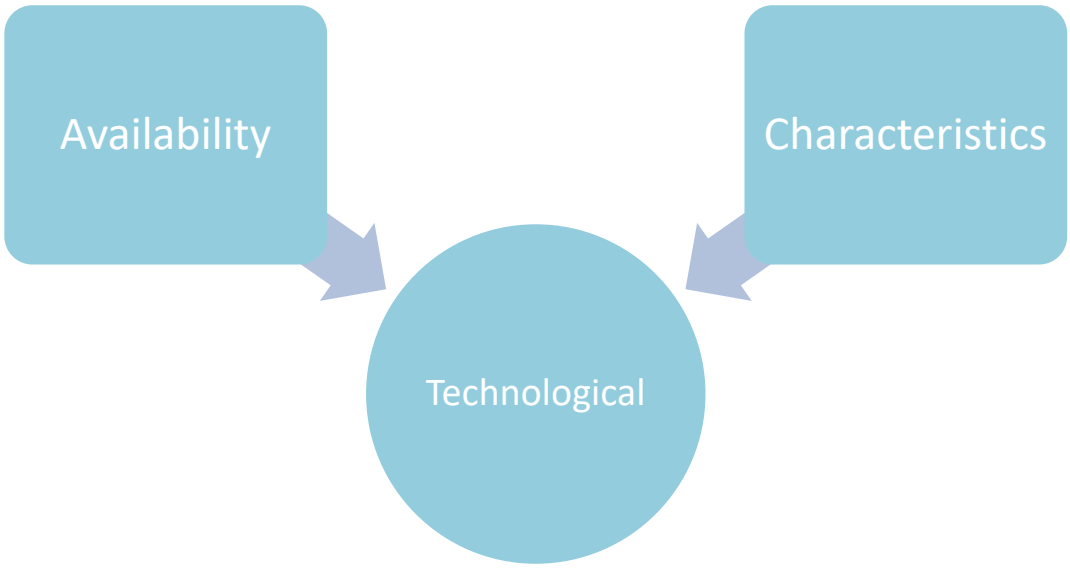

Figure 8: TOE Framework – Technological

IT resource flexibility and scalability - The key benefit for the logistics organization is that information appears promptly in their working data. Food Service LTD would have the chance to enhance their operations in this instance. Clouding allows participants in operations to rapidly view and respond to changes or data received.

Increase flexibility and mobility - Users can alter their minds without risking major "people" or "money" concerns. Mobility will assist to avoid problems relating to this topic.

Business continuity. Backups on a regular basis and catastrophe recovery – As a firm officially stated, a lot of difficulties were emerging in the area of information loss, thus technology with these kinds of capabilities will be very valuable for them.

Shared computing resources - Rather than squandering valuable and costly processing power, which is an inherent disadvantage of the present client-server

architecture, cloud computing enables a more efficient and cost-effective use of computing resources.

Cloud services will continue to develop, despite increased competition from both existing businesses and new entrants. According to some analysts, the cloud industry will exceed $270 billion by 2020, with SaaS presenting greater growth prospects than any other area (Gartner, 2013).

4.4.2 Organizational context

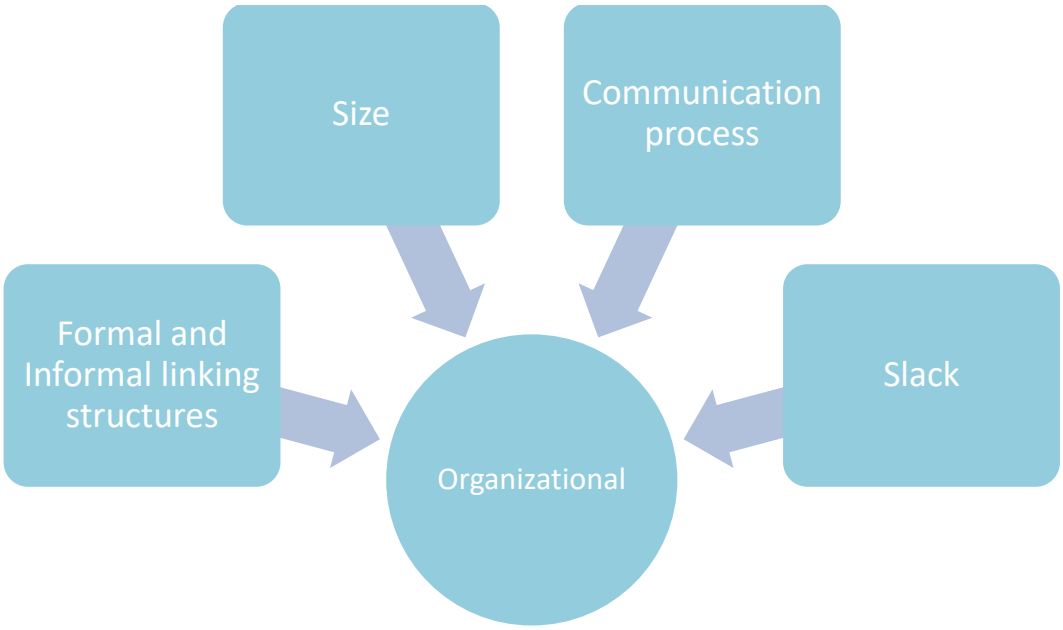

Figure 9: TOE Framework – Organizational

Foodservice is a Logistics Company in Georgia with substantial expertise and a strong brand name - normally international firms have considerably more resources, and because they have opted to develop, they have more chances than their competitors.

Strong quality and grow in recent years - As I discovered after the survey, quality control is at an advanced stage of development. The company has internal procedures in place to manage and modify all the services it offers.

Scope of business operations - Food Service LTD operates in the distribution of products and services and has extensive expertise in creating successful operations structures without the use of modern technological solutions such as the cloud. It is one of the industry's leaders, and one of the reasons for this is the structure they applied through their operations.

Organization mission - The company's objective is to be a partner with industry by offering storage and transportation services that fulfill the customer's expectations of excellence in service, productivity, and cost. Because of offering this sort of mission necessitates diversity of services, which improves control over operations, and this is one of the change drivers.

4.4.3 Environmental context

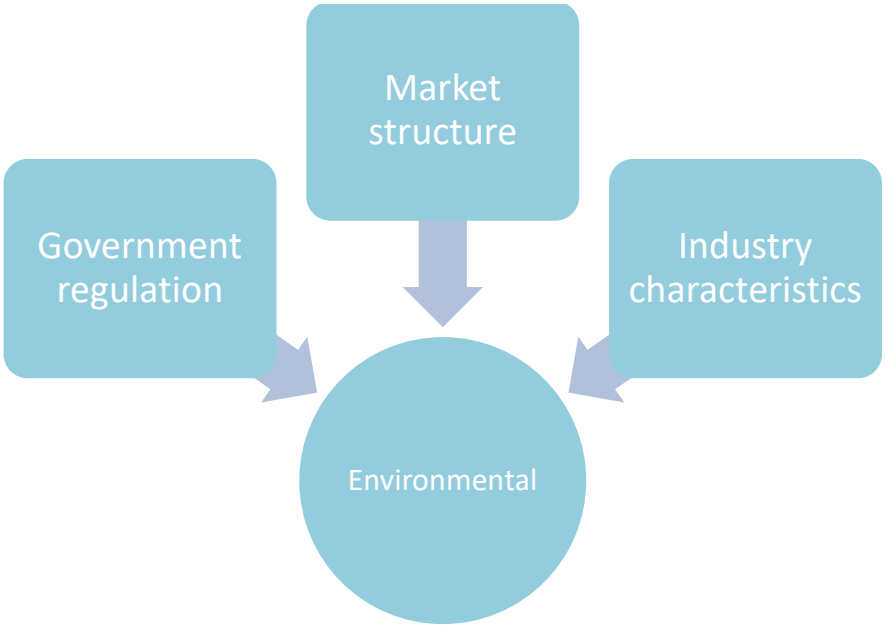

Figure 10: TOE Framework – Environmental

A low corporation tax rate is one of the market advantages that makes doing business simpler than in the case of a high rate of charges.

A government that wants to attract investment and takes the necessary steps – Over the last decade, all the regulations that make conducting business simpler have been established.

Low level of corruption - The lower level of bureaucracy, the lower level of corruption. The company may function and complete all its tasks without encountering any problems.

Fast growing market - The IT market in Georgia is rapidly expanding. Throughout the country, the government and commercial sector developed demand for information technology throughout the previous year.

4.5 Data Results

Table 2 provides an overview of the outcomes received.

Size of the company	More than 650 employees
Experience in IT	5 years
Which type of cloud services are the most useful for the company?	Platform as a Service (PaaS)

Table 2: Some facts about Food Service Ltd

As can be seen from the above table, the organization has over 650 workers and some IT experience. The firm has a minor IT department that is now covering the company's demands. Because of the details of the software they employ, they believe that the Platform as a Service option is the most appealing for future Cloud service adoption.

The next section discussed the benefits of adopting cloud computing. The primary criteria were picked based on the publications evaluated in the previous section. They are as follows:

Flexibility and scalability of IT resources	5
Greater IT efficiency and agility	4
Avoiding capital expenditure in hardware, software etc.	3
Increasing computing capacity	3
Cost reduction	3
Business continuity (regular backups and disasters)	5
Much greener way of managing IT	1
Mobility	5

Table 3: Main reasons for adopting Cloud Computing

As shown in Table 3, the key benefits that the organization anticipates from cloud computing are flexibility and scalability of IT resources, mobility, and regular backups. Furthermore, efficiency and agility are also affected by the logistics management and cloud. Although avoiding capital expenditure and increasing computing capacity are two minors, they are also valuable factors.

Greener IT management is less important to the firm. According to Hsu et al. (2014), this aspect is typically not as critical for small businesses as it is for large ones, due to their higher level of responsibility and potential reputational difficulties that may impact client attitudes toward them.

Privacy	4
Availability of services and/or data	3
Integrity of services and/or data	3
Confidentiality	4

Loss of control of services and/or data	4
Lack of ability of providers in case of security incidents	5
Inconsistency between trans-national laws	1
Pay-per-use scheme is unclear for you	2
Variable cost can be uncontrolled	2
Cost and difficulty of migration on cloud	4

Table 4: Main concerns about Cloud Computing

The data show that security incidents are the most crucial concern for the company (Table 4). Since small businesses often have less resources than large businesses, all events and threads involving cloud computing in general pose a greater danger in small businesses than in large, worldwide corporations such as Microsoft or others.

The cost and difficulty of migrating to the cloud, as well as privacy, confidentiality, and loss of control over services and/or data, are all critical challenges for Foodservice. The company has all its data on local hard drives, has constructed the system, and altering it will be difficult for them. In the case of privacy and confidentiality, their concerns are related to environmental challenges, such as government or commercial organizations linked with government having some authority over the service provider through various channels. Additionally, less relevant reasons include suspicion over variable costs, pay per usage, and inconsistency across global legislation.

4.6 Limitations

There are several limitations that develop as a result of internal company operations while performing data analysis. A research limitation is described as a standardized bias of the study design that the researcher cannot change and that affects the analysis and results of the inquiry (James & Judy 2014). A research paper may involve several limitations, which are the results of a limited sample size, a lack of reliable and accessible information, a lack of preceding study on the subject topic, or the methodology employed to collect data. As a result, it has a number of negative consequences for the external validity of the research findings (Price & Murnan 2004). When study limitations are not disclosed or are only partially described in the research design, it leads to insufficiently qualified research readers and reduces the credibility of the results. As a result, several studies have found that it is critical for researchers to acknowledge and introduce study limits as an important aspect of the inquiry report (Ioannidis 2007; Kinloch 2020).

In this study, the limitations were the limited domestic market data and the absence of infrastructure supporting technology. With the lack of infrastructure supporting technology, there is hard for analyzing and comparing the company case with others.

5 EMPIRICAL FINDINGS

5.1 Discussion

The findings suggest that cloud computing has a good impact. Furthermore, they indicate the primary problems from the firm's perspective, which the company must solve in order to experience all the benefits of cloud computing, particularly those that are essential to the Food Service Ltd.: IT resource flexibility and scalability, increased IT efficiency and agility, business continuity (regular backups and calamities), and mobility.

In terms of the analysis, it is now known which are the primary technological, organizational, and environmental elements that impact Foodservice's adoption of Clouding. According to the answers provided by the company, technological stimulators to innovate are Flexibility and scalability of IT resources, which allows the company to be more successful at the operational level; Agility and efficiency of IT resources, which brings cost savings and; Mobility, which is one of the most important aspects for a distribution company; Business continuity and regular backups, which provide safety and give the company representatives to control over the data.

In the case of an organizational context, the main supporting factors of innovation adoption are the scope of the operations Food Service has, the mission of the organization, which includes being effective and thus having high importance towards the adoption process, and the high will of management towards innovation adoption.

The environmental context contains a number of critical aspects that might impact decision making. The key reason for making investments in general is the low corporation tax rate, which has an impact on Food Service as well. The Georgian government has various types of projects for innovation support, the most important of which is the Information and Technology Agency of the Ministry of Economics and Sustainable Development, which changes rules toward innovation adoption regulations and makes it easier to go in this direction. Market

characteristics are also essential. Several of the company's rivals have already incorporated Cloud Applications.

In each level of the analysis, there are threats and difficulties that function as distractions during the decision-making process. The most important technological shortcomings or risks are mostly security reasons that impact cloud in general and small cloud service providers. Another critical issue for the organization is the ability to transfer data to cloud and the apps that they are currently employing. The organizational difficulties that may be the most challenging during the adoption process are human resource qualifications and the cost of cloud migration, which is directly tied to the size of the firm and its ability to sustain costs during specific strategic changes. Environmental problems that the corporation may encounter include a lack of expertise about cloud use among partner companies, particularly small ones that have seldom utilized this sort of service. Another key element is the monopoly of Internet providers and network coverage throughout the nation (4G, Wi-Fi, etc.), which is closely related to the main benefits of the cloud.

6 CONCLUSION AND RECOMMENDATIONS

In this chapter, the concentration of the research paper will provide results to modify the relationship between the theoretical frameworks concerning cloud computing in supply chain management with the evident case study. After discussing the analysis results, further suggestions for advanced research will be presented based on the investigation’s highlights and insights to consolidate the study findings.

6.1 Conclusion

This research concerns a Georgian distribution firm that is thinking about adopting Cloud Computing services, especially Private cloud PaaS. The TOE framework was used to conduct a qualitative analysis of the main and secondary data. The findings enable the student to answer the dissertation's primary issues, namely, which are the main drivers of cloud computing adoption, and which are the main problems that enterprises are projected to confront.

The research' primary results are that the company's main benefits are flexibility and mobility. Flexibility enables the organization to instantaneously and, in any magnitude, scale up or scale down the IT resources required, allowing it to respond to the natural swings of its business. Furthermore, no large expenditures are required to build up the infrastructure. The mobility derives from the fact that everything (applications, data, communications, etc.) is available on the internet and therefore available wherever it is required and can be accessed by any available device, whether fixed or mobile. They also rated frequent and consistent backups as a crucial aspect of the cloud computing service. The results previously mentioned are the solution to the first research question. The advantages exist in technical, organizational, and environmental conditions.

The second research question focused on the issues that the firm is facing. The firm's worries were limited to data privacy and liability issues, owing mostly to the fact that the company chosen to supply the service is new and tiny. In terms of data protection, a better understanding of the provider's activities is required to

determine whether or not this is an issue that needs to be addressed (the provider may already be addressing it in a satisfactory manner). Liability is something that may be worked out before signing a contract for a service. Concerns may have impact on both the technological and environmental environments.

As a result, it indicates that Food Service Ltd stands to benefit more than lose from the use of cloud computing. First and foremost, due to the nature of the sector, there is a constant demand for flexibility and mobility. In the organizational context, the breadth of company operations and cost efficiency are the primary motivators, but in the environmental context, competitive pressure is the most important motivator.

6.2 Recommendations

The lack of study on cloud computing adoption demonstrates that understanding how cloud computing affects businesses and the advantages it may give is still being investigated.

Although the technology behind cloud computing has been accessible for many years, cloud computing as a computing paradigm is just now gaining traction. As a result, there is a lot of room for more investigation. More case studies, both successful and failed, are required to further grasp the issue and develop a roadmap for future study.

Other essential topics to investigate stem from the problems that cloud computing growth in businesses. This research might concentrate on any or all the three situations mentioned in this work. For example, new technologies at both the hardware and software levels can increase security. In terms of the organizational context, one may investigate the effects of cloud technology adoption on organizational behavior, working environments (office vs. home), work performance (isolation vs. time lost travelling), and so on. Finally, various concerns may occur in the setting of the environment, such as exchanging information with other organizations and sharing data responsibility with consumers.

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APPENDIX 1: QUESTIONNAIRES

1. Name:

2. Position:

3. What is the size of the enterprise you represent?

- 1-9
- 10-50
- 50-250
- over 250 Employees

4. Experience in IT (as user, in years)

5. How did you learn know about Cloud Computing?

- Advertisement
- Partner organizations
- Competitors
- Friends

6. Experience in Cloud Computing (in years) email, software, server, platform, etc.

- 0-1
- 1-5
- 5-10
- more than 10
- None

7. Which type of cloud services are the most useful for you?

- Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)

- Other:

8. Which, from the following, do you think is the most feasible for the industry you're operating in

- Public Cloud (owned and managed by an unrelated business)
- Private Cloud (owned and managed internally)
- Community Cloud (owned and managed by a trusted partner)
- A federation of clouds provided by various sources (partner, private, etc.).
- Other:

9. Which services/applications supporting business would you outsource to a Cloud Computing service provider?

- Payroll
- Human Resources
- Procurements
- CRM/Sales Management
- Accounting and Finance
- Project management
- Application development on the cloud
- Anonymized data analysis
- Other:

10. What are the main reasons for adopting cloud computing? Rank from 1 (Low) to 5 (High).

- Flexibility and scalability of IT resources
- Greater IT efficiency and agility
- Avoiding capital expenditure in hardware, software etc.
- Increasing computing capacity
- Cost reduction

- Business continuity (regular backups and disasters)
- Much greener way of managing IT
- Mobility

11. What are the main concerns regarding adopting cloud computing? Rank from 1 (Low) to 5 (High)

- Privacy
- Availability of services and/or data
- Integrity of services and/or data
- Confidentiality
- Loss of control of services and/or data
- Lack of liability of providers in case of security incidents
- Inconsistency between transnational laws and regulations
- Pay per use scheme is unclear for you
- Variable cost can be uncontrolled
- Cost and difficulty of migration to the cloud (legacy software etc...)