

Cloud Computing Adoption by Medium Sized enterprise

A Case study of a Georgian Logistics and Distribution Company

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Dissertation for Master of Management

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2015

Abstract

Cloud Computing brought with it a revolution in the traditional IT delivery, since it enables companies to use and consume computational resources as a utility.

The main positive impacts from adopting cloud computing are the computational resources elasticity, since companies may use as much or as little resources (computational power, data storage, and bandwidth) as they need, and the lower costs involved, as companies only pay for the resources and workload they use and do not need IT staff. Therefore by adopting could computing, companies may focus on their business instead of on how to build, maintain, and manage their computational infrastructure. In addition, it may be faster to get the applications running and also to dynamically adjust them to the needs and fluctuations of the business. On the other hand, the adoption of cloud computing implies trusting an outsider with the most valuable asset a company has, its data. There are mainly three types of data concerns: data protection, data access, and data breach.

Cloud computing is a relative new technology and thus, not many studies have been reported in the literature regarding its adoption and the main issues (advantages and pitfalls) that should considered. Thus, small sized companies that cannot afford to pay to find out if cloud computing is the most appropriate technology for their needs have no way of finding support for such decisions. This work intends to contribute to bridge this gap. As such, the main aim of this work is to understand the major factors, both positive and negative, influencing Cloud Computing adoption by small companies. To support and test our findings, we resort to a case study involving a distribution and logistics Foodservice company that operates in Georgia.

The data used for the analysis was collected via survey and face-to-face interviews. Secondary data were collected from the official structures of Georgian government, international governmental organizations, and non-profit organizations. The methodology used to analyze the data resorts to the TOE framework, which looks into three perspectives: technological, organizational, and environmental. More specifically, the methodology

adopted uses answers from the survey and data obtained from the face-to-face interviews to highlight the main factors to promote cloud adoption and challenges during and after implementation.

The case study has shown that the main drivers towards change for Foodservice Ltd are the flexibility of using exactly the resources needed at all times and the mobility obtained, since data can be accessed from wherever it is needed and with whichever hardware is available (PCs in offices and tablets on the move). Another very important feature are the regular and frequent data backups. These drivers seem to be industry related. We have also found that the Foodservice Ltd "real" concerns are the provider lack of liability, as it is a recent and small company. Nonetheless, it seems that Foodservice Ltd has a lot to gain from adopting cloud computing.

Key-words: Cloud computing, business process management, innovation adoption, pricing mechanism, deployment model.

JEL-Codes: O3; O33; O32

Resumo

A computação em nuvem revolucionou a utilização tradicional das tecnologias de informação (TI), uma vez que permite às empresas o uso de recursos computacionais como um utilitário.

O principal impacto positivo da adoção de computação em nuvem é a elasticidade de recursos computacionais, uma vez que as empresas podem utilizar apenas os diferentes recursos (largura de banda, armazenamento de dados e capacidade computacional) que necessitam para suportar o processo de negócio, e os custos envolvidos, pagando apenas os recursos e serviços utilizados reduzindo, assim, o esforço monetário e humano em aquisição, gestão e manutenção de TI. Com a adoção de computação em nuvem as empresas podem focalizar os seus esforços e recursos no processo de negócio, por reduzir substancialmente as preocupações com grandes investimentos em infraestruturas TI, sua gestão e manutenção, associado à disponibilidade e acesso a TI de ponta e, da possibilidade de dinamicamente as ajustar às respetivas necessidades e flutuações do negócio. No entanto, esta adoção implica confiar no serviço de computação em nuvem e entregar a uma outra empresa o bem mais valioso que a empresa tem, os seus dados. Existem basicamente três tipos de preocupações em relação aos dados: proteção de dados, acesso a dados e violação de dados. A estratégia de custos é fulcral para o sucesso da utilização de computação em nuvem de uma empresa, se mal definida, pode uma estrutura de custo inicialmente atraente se traduzir na realidade em um problema para a mesma, pagando custos ocultos.

Computação em nuvem é uma tecnologia relativa nova e, portanto, não há muitos estudos relatados na literatura sobre a sua adoção e considerações sobre as principais questões associadas à sua adoção (vantagens, desvantagens e armadilhas). Assim, as pequenas e médias empresas (SMEs), que não podem pagar assessoria para a análise da possibilidade de migração para esta tecnologia, computação em nuvem, se é a mais adequada para suas necessidades, têm poucas fontes de encontrar apoio para tais decisões.

Este trabalho pretende contribuir para colmatar esta lacuna. Como tal, o objetivo principal deste trabalho é entender os principais fatores, positivos e negativos, influenciando a adoção de computação em nuvem por SMEs. Para suporte e testar as nossas conclusões, recorremos a um estudo de caso envolvendo uma SME de distribuição e logística, a Foodservice, sediada e a operar na Geórgia.

A metodologia utilizada para recolha e análise de informação foi qualitativa, sendo usado os instrumentos entrevista semiestruturada para a recolha de dados. O inquérito contem dois grupos principais de perguntas, um que permitem aferir sobre os principais elementos catalisadores das mudanças e dos desafios da adoção de computação em nuvem, o outro, com questões relacionadas com a tomada de decisão de adoção da tecnologia. Dados secundários foram recolhidos de fontes governamentais da Geórgia e de organizações internacionais e organizações sem fins lucrativos que são amplamente reconhecidas. Foi utilizada a ferramenta TOE ao estudo de caso, possibilitando a oportunidade de analisar a situação da empresa em três posições principais: tecnológica, organizacional e ambiental. Foi realizada entrevista face-a-face e a análise de dados secundários da empresa. A ferramenta TOE foi usada essencialmente na análise de contexto ambiental e organizacional.

Como resultado, o estudo de caso evidencia que os principais drivers para a mudança para a computação em nuvem da Foodservice ltd foram fortemente relacionados pelo negócio em que operam, logística e distribuição. Assim, a flexibilidade e a mobilidade, junto com capacidade de backups regulares dos dados, foram os maiores motivadores para a adoção da computação em nuvem. Dado que a empresa parceira a fornecer os serviços em nuvem para a empresa Foodservice ltd é de pequena dimensão para ser comparada com provedores globais desta tecnologia, os principais fatores de risco e desafios apontados para a mudança para computação em nuvem foram a fiabilidade do fornecedor, a falta de responsabilidade dos fornecedores em caso de incidentes de segurança, juntamente com questões de migração, privacidade e fiabilidade de dados.

Como conclusão, podemos aferir que os benefícios para o Foodservice ltd em adotar a computação em nuvem são muito mais valiosos do que os desafios que podem surgir durante

a mudança para a computação em nuvem e, baseada na revisão de literatura dar algumas recomendações para a empresa.

Palavras-chave: Computação em nuvem, Gestão do processo de negócio, Inovação, mecanismo de preço, modelo TOE.

JEL-Codes: O3; O33; O32

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1. Introduction

In this chapter, we begin with an overview on cloud computing and then provide our research questions, as well as the motivation for this work. We conclude this chapter with the description of the structure of the dissertation.

1.1 Cloud computing overview

The United States National Institute of Standards and Technologies (NIST) defines Cloud computing 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". The goal of cloud computing is to allow users to speed up Information Technology (IT) operations while at the same time decrease the costs of doing so. This is achieved mainly through virtualization, i.e., by separating a physical computing device into several virtual computing devices. The latter ones, can be used to perform different tasks simultaneously, for one or several users. Virtualization is not a new concept and it has been pioneered in 60's by General Electric, Bell Labs, and IBM (Rosenblum, 2004). However, within cloud computing it is used in a broader sense allowing for the following characteristics (NIST): on-demand self-service (usage of computer capabilities when and as needed); broad network access (location and device independent); resource pooling (resources dynamically assigned to meet consumer needs); rapid elasticity (scale up and scale down in any quantity at any time); measured service (resource usage can be monitored, controlled, and reported). Since cloud computing needs are different for different types of users, providers have three levels of service: platform (PaaS), software (SaaS), and infrastructure (IaaS). These services can be provided in a number of ways. According to the recommendations of NIST, there are four main service deployment methods: private, public, hybrid, and community. Obviously, the service offered by each of them is different and therefore, the level of security and cost sharing are also different. These issues are described in more detail below.

1.1.1 Service Models

Cloud computing has many users and their needs may differ, not only in scale but also in the type of service. As mentioned before there are three service models each corresponding to a model category.

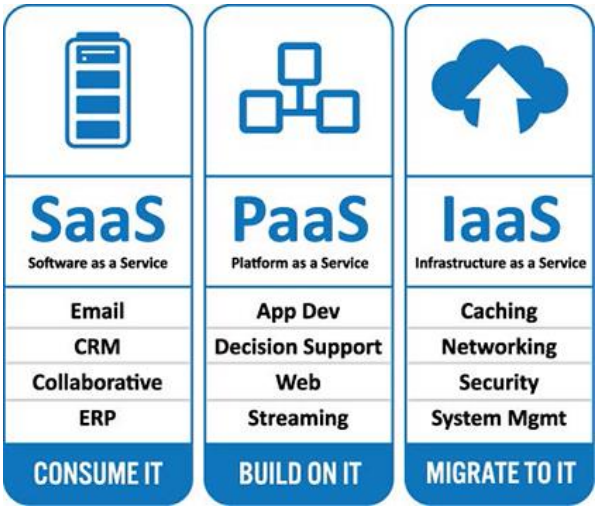


Figure 1 - Service models of Cloud Computing – Source: IBM

IaaS -- Infrastructure as a Service

This is the basic service, in which the provider offers the hardware and technology for computing power, storage, operating systems, or other infrastructure. IaaS refers to online services that abstract users from the detail of infrastructure like physical computing resources, location, data partitioning, scaling, security, backup etc. IaaS clouds often offer applications that handle tasks including system maintenance, backup and resiliency planning and additional resources as a virtual-machine disk-image library, raw block storage, file or object storage, firewalls, load balancers, IP addresses, and virtual (VLANs) and software bundles.

Customers pay on a per-use basis, typically by the hour, week, or month. Some providers also charge customers based on the amount of virtual machine space they use. This pay-as-you-go model eliminates the capital expenses of deploying in-house hardware and software.

PaaS -- Platform as a Service

Provides an application platform or middleware as a service on which developers can build and deploy custom applications. PaaS vendors typically develop toolkits and standards for development and channels for distribution and payment that they offer to application developers. Application developers can concentrate on developing and running their software solutions without worrying about (the cost and complexity of) buying and managing the underlying hardware and software layers.

SaaS -- Software as a Service

Comprises end-user applications delivered as a service, thus users gain access to application software and databases, from cloud clients, and the providers manage the infrastructure and platforms that run the applications, i.e., install and operate the software in the cloud. Cloud users do not install or run the application, which simplifies maintenance and support. Cloud applications differ from other applications in their scalability, which can be achieved by cloning tasks onto multiple virtual machines, although the cloud user sees only a single access-point.

The pricing model for SaaS applications is typically a monthly or yearly flat fee per user and some claim that SaaS gives a business the potential to reduce IT operational costs by outsourcing hardware and software maintenance and support to the cloud provider. In addition, with applications hosted centrally, updates can be released without the need for users to install new software. The main concern is security, since the users' data is stored on the cloud provider's server. The most commonly referenced example of SaaS is Salesforce.com, which provides a customer relationship management (CRM) system accessible via the Internet.

1.1.2 Deployment model

The term deployment has its roots in the military setting, where it is used to describe the placement of equipment and troops in a battlefield. In IT, it is used to define the way in which computer systems or applications are installed, tested, and implemented.

Regarding cloud computing, there are four main deployment models, namely: private cloud, community cloud, public cloud, and hybrid cloud, as recommended by the NIST.

In private clouds the client has dedicated resources as if the client buys, builds and manages his/her own infrastructure. This way removing a number of objections to the cloud computing model including control over data, security concerns, and issues connected to regulatory compliance. This model, however, does not allow for significant cost efficiencies. Amazon provides the option of a virtual private cloud.

Public clouds are particularly appropriate for scenarios where applications and services are used by many clients and would otherwise require large investments in infrastructures. In this scenario, the cloud service provider is in control of the infrastructure, which is shared amongst various clients, thus reducing capital expenditure and bringing down operational IT costs. This service can be provided free of charge or on the basis of a pay-per-use. Google is an example of a public cloud. Several SaaS applications provide options to their clients to maintain their data on their own premises to ensure data privacy.

Hybrid models try to take advantage of both public and private models, since they provide private clouds for secured applications and data hosting and keep shared data and applications on the public cloud, this way increasing security while still having some cost benefits. This model is able to migrate workloads between public and private hosting without any inconvenience to the users, when and if necessary, since in it the cloud is a composition of two or more clouds (private, community, or public) that although different are bound together. Thus, this model is capable of offering the benefits of multiple deployment models.

Community clouds are positioned half-way between private and public clouds, since they shares infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.). As in private clouds, they can be managed internally or by a third-party and either hosted internally or externally. As in public clouds, the costs are spread over several users. Since there are fewer users than in a public cloud (although more than in a private cloud), cost savings are only achieved partially.

1.1.3 Security issues

As mentioned before security is one of the major concerns of cloud computing users. Although there are benefits of using cloud computing, including some key security advantages, there are just as many, if not more, security challenges that prevent customers from committing to cloud computing. Data security involves data protection, user authentication, and data breach. Data protection while stored and exchanged is usually dealt with by means of encryption, which can either be provided by the cloud provider or by the client. Access to data has to be supervised in order to ensure that only those who are authorized can handle it. To do so, it is needed not only to restrict access, for instances via user authentication, but also to be able to view data access logs and audit trails. Finally, the service provider must have in place contingency plans to address data breach and data unavailability situations. Although liability may be negotiated between the parts, ultimately the customer is the one more at loss since data disruption may prevent critical operations. Additionally, companies should also have contingency plans in place for bankruptcy or buyout of the cloud provider.

1.2 Motivation

We are living in a period of digitalizing everything. Every person who lives in more or less developed countries has access to the digital world and the abilities that it gives are enormous. Cloud computing provides the users with the opportunity of renting IT infrastructure, platform, and software services when needed. Cloud clients can deploy their business applications, store data, and run analyses over the Internet on a pay-per-use basis (Chang, Walters et al. 2013).

In the past IT innovations were initially only adopted by, and even made available to, big companies and very often it would take a long before small companies has the opportunity to access them.

For the past two years the global tendency is to expand the clouding market and make this technology available to everyone. Since cloud computing is still in its infancy, although moving at a very fast pace, it is hard to predict how and where will it evolve to, even in the near future. In addition, we have been witnessing massive cost reductions, mainly due to the big players, like Oracle, Amazon, Google, Dropbox, to increase the marked and particularly their market share.

1.3 Research questions

This study intends to answer, or at least find some insights on the following questions:

1. What are the main drivers to the adoption of the cloud computing for a specific small sized company (Foodservice Ltd)?
2. What are the main challenges towards the adoption process for that company?
3. Should the company adopt Cloud services?

The need to answer questions 1 and 2 arises from the fact that cloud computing is a very recent technology and there are no strictly rules that provide recommendations on whether or not to adopt it, or even on which may be the main drivers to the change.

Question 3 results from the methodological approach to the previous two questions that will be answered by using a TOE framework to analyze our case study.

1.4 Dissertation structure

This dissertation is organized in 6 chapters. After this introductory chapter, where we provide a general overview of cloud computing. Chapter 2 provides a literature review on cloud computing and its adoption. As in this work a case study involving a specific company is

developed, a review on the company and on the country it operates in are given in Chapter 3. Chapter 4 explains and discusses the methodology used and the results thus obtained are provided an explained in Chapter 5. Finally, in Chapter 6 we draw some conclusions and point out possible directions for future work.

2. Literature Review

This chapter introduces the concepts and theories relevant for the Cloud Computing research field. First, we define Cloud Computing and its features subsequently and related with first section its main functions of it. Then, several theories and models are reviewed and discussed. Taking into consideration that our study is based on a qualitative methodology steps taken in order to fulfill the primary purpose are explained. At the end of this chapter we present some similar studies and highlight their contributions to the literature and to this dissertation.

2.1. Relevant definitions (for the theme) according to the literature

This section is dedicated to the definition of the main concepts in Clouding, to provide better understanding better the of the theme purpose.

Cloud computing is a "model for enabling ever-present, convenient, on-demand network access to a shared pool of configurable computing resources (such as networks, servers, storage, applications, and services) that can be rapidly accessed" (Mbuba & Wang, 2014). Cloud computing enables customers to rent IT infrastructure, platform, and software services in the cloud when needed (Hsu, Ray, & Li-Hsieh, 2014).

It is transforming the world of electronic commerce. There are many cloud providers that promote different cloud services that can be used to host different applications. These services are functioning in a same way as the normal data centers (F.-K. Wang & He, 2014).

With this diversity of this field we need to understand main concepts of Clouding and down in this section you can see definitions that are relevant to the theme, to make it more comfortable and easy to read.

According to NIST (Peter Mell, 2011) we have several definitions of types of Cloud Computing (Table 1 – types of cloud services)

Public Cloud	This type of Cloud is more appointed to organizations wishing to save costs and time without obligations of deployment and maintenance. For organizations without Cloud Computing deployment, this is the quickest way to make use of Cloud Computing. Drawbacks: Data security and conflicts concerning legal and ethical issues.(Hsu et al., 2014; Oliveira, Thomas, & Espadanal, 2014; Peter Mell, 2011)
Private Cloud	Within this type of Cloud data management and access are provided only to internal users. This approach is suitable for organizations focusing on privacy and data security, or to change or simplify the way people work. Drawbacks: implementation can be complicated, time-consuming and costly to complete.(Hsu et al., 2014; Oliveira et al., 2014; Peter Mell, 2011)
Hybrid Cloud	Hybrid clouds are made of private and public clouds. This approach is suitable for organizations wishing to reduce costs, whilst maintaining privacy and data security. Drawbacks: integrating different architectures is not easy, this model ends up being both as a public cloud and a private cloud due to complexity and time involved(Hsu et al., 2014; Oliveira et al., 2014; Peter Mell, 2011)
Community Cloud	A cloud which is controlled and used by a group of organizations that have shared interests, such as specific security requirements or a common mission. This is a public cloud, but to restricted uses. Drawbacks: It takes years to establish a working community for sharing and mutual learning. However, the added values and benefits for the Academic Community could worth far more than the time and effort spent.(Hsu et al., 2014; Oliveira et al., 2014; Peter Mell, 2011)

Table 1 - Types of Cloud

There are three types of services in Cloud Computing according to the most of the authors (Table 2 – types of Cloud services) (Chang, Walters, & Wills, 2013; Hsu et al., 2014; Mbuba & Wang, 2014; Oliveira et al., 2014; Peter Mell, 2011; F.-K. Wang & He, 2014):

Types of Cloud Computing Services	Definition	Examples
Software as a Service (SaaS)	SaaS is Service or Application Clouds, which helps us with the implementation of specific business functions and business processes that are provided within cloud capabilities. It means, that they provide all this applications and/or services using a cloud infrastructure or platform.(Peter Mell, 2011)	Google Docs, Gmail, MYOB and SAP
Platform as a Service (PaaS)	PaaS gives opportunities for its users to develop different kinds of applications and services and host them. PaaS typically makes use of dedicated APIs (application programming interface) to control the behavior of a server hosting engine that executes and replicates the execution according to user requests (e.g., access rate).(Peter Mell, 2011)	Google App Engine, Salesforce.com
Infrastructure as a Service (IaaS)	IaaS divided into Compute Clouds and Resource Clouds. Compute Clouds provide access to computational resources such as CPUs, hypervisors, and utilities. Resource Clouds contain managed and scalable resources as services to users – in other words, they provide enhanced virtualization capabilities.(Peter Mell, 2011)	Amazon EC2, Salesforce.com

Table 2 - Types of Cloud services

With this information now we can go to the next section to understand better theories and models that will be used further.

2.2. Main theories and/or models

As we previously mentioned, Clouding is at the moment in its infancy, however its adoption has great potential. The theories developed so that are not yet capable of providing an easy understanding of how Cloud can help and influence small and medium sized enterprises.

Nevertheless, the major steps were already been taken, especially what counts - framework were built. In table 3 we introduce four frameworks that are experienced more detailed.

Definitions	Meaning	Studies
TOE framework	Explains the process of innovation in the context of an enterprise. Technology: relative advantage, complexity, compatibility; Organization: top management support, firm size, technology readiness; Environment: competitive pressure, trading partner pressure.	Examining cloud computing adoption intention, pricing mechanism and deployment model (Hsu et al., 2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and service sectors (Oliveira et al., 2014)
DOI framework	Prominent adoption model used in Information Systems (IS) research. It proposes five attributes that explain the adoption of innovation in an organization. Attributes: (1) relative advantage; (2) compatibility; (3) complexity; (4) observability; and (5) trialability.	
Cloud Computing Business Framework	Is proposed to help organizations achieve good Cloud design, deployment, migration and services	The development that leads to the Cloud Computing Business Framework(Chang et al., 2013).
A reference model for cloud (RMC)	Is an Enterprise Cloud Architecture for research and industrial practices, and plays a central role in defining research clouds, use cases and added values.	

Table 3 - Important frameworks

According to Hsu et al. (2014), the Technology, Organization, Environment (TOE) framework is proposed to explain the process of innovation in the context of an enterprise. This framework considers three features of an enterprise that influence the adoption of

innovation: the contexts of technology, organization, and environment. The technology context refers to the internal and external technology relevant to the organization and the technologies that are available for possible adoption. The organization context refers to the descriptive characteristics of the firm (i.e., organizational structure, firm size, managerial structure, the degree of centralization), resources (human and slack resources), and the process of communication (formal and informal) among employees. The environment context comprises market elements, competitors, and the regulatory environment (Oliveira et al., 2014). Author has suggestions that innovation is a communication process using the various channels within the social system. Three factors influence the adoption of innovation in organizations that are united in concept of TOE framework (Oliveira et al., 2014).

Diffusion of Innovation theory (DOI) is a fundamental approach to investigating how a new technology spreads. DOI theory is concerned with the way that a new technological innovation, progresses from creation to use. It describes the patterns of adoption, explains the mechanism of diffusion, and assists in predicting whether and how a new invention will be successful. Diffusion of innovation theory posits two categories of factors that influence a firm's adoption of innovations: Innovation Characteristics and Organizational Characteristics. Factors within the Innovation Characteristics category are the "perceived attributes of the innovation" that either encourage or inhibit innovation use.(Rogers, 2003) It indicated that five attributes of an innovation (i.e. relative advantage, compatibility, complexity, trialability, and observability) can explain 49–87% of the variance in rate of adoption.(Rogers, 2003) While the "Innovation Characteristics" explain a portion of the innovation diffusion, these results are primarily based on studies at the individual decision-making level (Hsu et al., 2014) According to Oliveira el al. (2014), DOI framework is a prominent adoption model used in Information Systems (IS) research with five attributes to explain the adoption of innovation by the organization: Relative advantage, the extent to which an innovation is better than the previous generation; Compatibility, the degree to which an innovation can be assimilated into the existing business processes, practices, and value systems; Complexity, how difficult it is to use the innovation; Observability, the extent to which the innovation is visible to others; and Trialability, the ease of experimenting with

the innovation. DOI is predominantly based on the characteristics of the technology and the users' perceptions of the innovation.

For Hsu et al. (2014) DOI is an approach to investigating how a new technology diffuses. DOI theory describes the key factors in adoption process, explains the structure of diffusion, and tries to predict if and how a new invention will be successful. This theory posits two categories of factors that influence a firm's adoption of innovations: Innovation Characteristics and Organizational Characteristics. Both of them have factors within that are influencing them. For example for the Innovation Characteristics there are the "perceived attributes of the innovation" that either motivate or not innovation use. When considering the diffusion of an innovation used at the organizational level, (Rogers, 2003) reported that several Organizational characteristics influence the adoption of innovations, such as centralization, size, slack, formalization and interconnectedness.(Hsu et al., 2014)

Chang et al. (2013) uses several mainstream Cloud computing frameworks to describe CCBF (Cloud Computing Business Framework) and to prepare several recommendations during its use, namely:

- A reference model for cloud (RMC) for integrating Cloud Computing and operation (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)

A reference model for cloud defines cloud computing as a tower architecture. Virtualization plays the basic role and sits on the top of hardware to sustain high-level cloud services. Infrastructure as a Service is third stage of it and then Platform as a Service and Software as a Service are on the top of the tower. (Chen, 2010). ITIL V3 is managerial approach towards the IT service management and consists with 5 stage quality continual measurement and improvement processes: Service strategy, Service Design, Service Transition, Service Operation and Continual service improvement. The main aim of the framework is to provide

constant improvements in services provided from both: business and customer perspective (Adams et al., 2008). Service-Oriented Architecture is supporting system for composing and coordinating Service-Oriented Computing and has four main stages: Co-ordination, Monitoring, Conformance and Quality of Service (Papazoglou and Georgakopoulos, 2003). IBM SOA framework defines the business process and explains the relations between the business model and IT services in the form of service computing (Chen, 2006). Key benefits according to Chen (2006) of the framework are efficiency improvements to complete business requirements and processes, resource management improvements and easiness of integration different services and technologies (Chen, 2006).

As a result this theory should help organizations in classification, organizational sustainability modelling, service portability and linkage.

Al-Aqrabi et al. (2015) review the main effectiveness of clouding and present a model that provides tools to reach an optimization of IT resources during the operation of the company.

Business Intelligence (BI) will eventually face a resource crunch situation due to the never ending expansion and cloud computing can be a solution that will solve the problem that might face SMEs. OnLine Analytical Processing (OLAP) is the user-end interface of BI that is designed to present multi-dimensional graphical reports to the end users (Al-Aqrabi, Liu, Hill, & Antonopoulos, 2015). BI and OLAP framework has a high business utility, because it helps in locating and eliminating or solving business process deficiencies, inefficient process steps and waste process steps. A BI and OLAP framework is expected to provide timely, accurate, organized and integrated information to business decision makers(Al-Aqrabi et al., 2015). The starting point for the analysis was OLAP cube, which is made of a number of cross-over the data warehouse tables in the form of multidimensional views. It can be visualized as a stack of two dimensional matrix planes. Each of plane provides information about the relationship between those two main dimensions. The matrices used on this model are dependent of each other. IAs we mentioned above, to transfer business intelligence in the cloud the authors are used BI and OLAP framework, which is a highly complex and multi-layer structure consisting of seven layers: A user interface layer, a layer of data analytics, a layer for strong the OLAP cubes, a data integration layer, a data layer

comprising of the data warehouses, a layer for acquiring data, the layer comprising the IT infrastructure and related resources (Al-Aqrabi et al., 2015). The authors advocate several benefits for a BI cloud integrity: cost efficiency, flexibility and scalability, reliability, enhanced data sharing capabilities and no capital expenditure. They even go further and state that taking BI to the cloud is the game changing phase of IT. They recognize however, that there are challenges that company must overcome:

- Compliance of the BI applications with web services architectural standards;
- Deployment of massively parallel data-warehousing system;
- The network architecture challenge;

When those issues will be clarified and neutralized taking BI into Cloud will be mostly done.

This research in general shows tendencies expected during those changes that are taking place in this direction. As a result authors are giving to us some important advices for future directions. As they say BI and OLAP framework is highly intensive and has multilayer architecture and using the cube of OLAP is quite important to make migration of BI on Cloud more effective.(Al-Aqrabi et al., 2015)

W. Wang, Rashid, and Chuang (2011) is about trends of cloud computing authors review global level of development of cloud services as well as of the market. Both of them at the moment are responsive to each other. At one hand market must push the companies to develop and improve their products and cloud computing sector must help to companies to understand the need of their services.(W. Wang et al., 2011)

As a major cloud computing services and providers of those services as most of the authors W. Wang et al. (2011) are also reviewing the biggest companies that are the main distributors.

Authors review separately all the types of cloud services types that are reviewed also in other researches. In case of Private Cloud they are concentrating on issues that are the most important in case of adopting cloud services. Skepticism that is around this type of service is mainly caused of privacy issues. Advantages that are in very important for all the users are

ability to design, develop and implement customized services and have control over the data fully. (W. Wang et al., 2011)

For many companies clouding can be way to protect their data. Authors are giving example of moving on cloud because of privacy issues: InterContinental Hotel Group (IHG) moved to cloud and started using services from SaaS providers.

Utilization of cloud services using smartphones is one of the interesting things to review. Smartphones are giving to its user's very clear view on one of the most important advantages of Clouding – Mobility. During the past few year's sales in smartphones surpassed sales in personal computers. So it implies that this trend would give impulse of growth of development private or public cloud. There are companies that are giving clouding services on smartphones: Google with Google drive, Microsoft with OneDrive, Dropbox etc.(W. Wang et al., 2011)

Open source Cloud Computing is one more trend that is becoming more and more popular at this time. For the past period there was a huge push on this direction by different technology companies to create "powerful cloud services on open standards". One of the pioneers was Apache software foundation that developed framework used by many hi-tech companies and gives opportunity to provide a reliable analysis for both – complex and structure data. (W. Wang et al., 2011)

To develop open source cloud computing standards, can be a helpful for the public in general and open source community specifically. AppScale, Cloud Foundry, Nimbus and Open Stack are some examples of open source cloud computing. In case of improving knowledge in Clouding, IBM developed Cloud academy that can be a lot helpful for future adopters of this kind of services (W. Wang et al., 2011).

All of the authors reviewed are mentioning that boundaries of clouding are not yet established. This is a new area that has great opportunities and potential as for small and medium sized companies as for individuals that want to increase their productivity in general. In individual level data stored on cloud can be accessed by mobile platforms and this gives

high importance to this field for them. (Chang et al., 2013; Hsu et al., 2014; W. Wang et al., 2011)

Advantages for the organizations can be ability test, implement and monitor their plans quickly, with high rate of efficiency. For instance, testing a product or service before launching is usually costly and highly competitive. This means that that with pay-per-use they can much more easily implement many types of products connected to digital world. Another very important advantage of it is for companies that have no or have limited IT people. With knowledge clouding for them it is much easier to overcome this problem.

Adoption, diffusion, implementation and impact of cloud computing is the most important in trends of the modern IT development practices. Literature that was reviewed by authors is divided into two main categories: namely organization and technical issues. In case of organization, authors are mostly reviewing adoption, diffusion, service level agreement creation/negotiation, social issues and pricing models for cloud computing services. In case of technical category, papers are concentrated more on service applications, workflow scheduling, cloud workflow and resource management, programming models and security issues on cloud computing.(Gupta, Seetharaman, & Raj, 2013; W. Wang et al., 2011)

There are always new type of emerging challenging issues from adoption of Cloud Computing services. On organizational level as well as on technical field. In technical side of the issues there is need of investigating the new system development methodologies for service providers and the companies which choose hybrid model for supporting their users by their services.(W. Wang et al., 2011)

As a recommendations authors are concentrating on value of utilizing Cloud Computing services in contrast to using traditional model where technology is acquired and maintained and supported. In case of reducing cost, cloud adoption is giving opportunity of high efficiency, but it needs also to be explored, understood and calculated. It will be possible when adoption will become more massive and global. As an example there can be we can see technical problems in case of organization that has in-house IT. Depending on its hardness, issue can be solved quite easily, but now after adopting cloud services to make

process automatized, what is the time to get back to normal business operations in case a complete cloud services are on halt? This is very important question that needs to be answered. (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011; W. Wang et al., 2011)

Economic environment we are living in is kind of demanding of evaluation innovations like cloud computing and the measurement of it. But before making decision to move on cloud companies must evaluate their in-house IT and make decision after to avoid problems that can be connected with move like this. For authors, future research must be on creating technology tools that increase transparency and accountability of cloud services to benefit the users. (W. Wang et al., 2011)

Low, Chen, and Wu (2011) in their paper "Understanding the determinants of cloud computing adoption" are trying to understand the main drivers of cloud adoption and for this are using surveys that were collected from 111 companies to make their research based on it. Their findings revealed that firm size, competition, management support and trading partner pressure are the most important drivers towards this change. (Low et al., 2011)

The use of internet-based resources to conduct business is important area for all the ambitious business companies worldwide. Cloud computing spread through a lot of areas related to information systems and thus within the operating systems, application software and technological solutions within the firm. A lot of cloud services became alternative to e-mail, office software and enterprise resource planning (ERP). With clouding it became easy of resource sharing with business employees or partners. User on the internet can have connection with many servers at the same time and exchange information between them. By global changes in network technologies and their development the mobility function of clouding improved. 3G, FFTH, WiMAX are an examples of high speed connections that are providing it with high accuracy. Thus clouding has provided the opportunity of flexible and adaptable attraction to the market on demand.(Hsu et al., 2014; Low et al., 2011; W. Wang et al., 2011)

Increasing of attempts to integrate business process in information systems (IS) is a global trend today along with building internet-based technologies for transacting business with trading partners.

The reason why cloud computing diffusion becomes important topic to research is the functions that clouding has – to enable firms to execute data transaction along value chain activities. (Low et al., 2011)

There is a bit disappointment in growth of users of clouding. The expectancy was a lot more than reality. According to a lot of research vast majority of interviewed by surveys think that the future of computing lies on Cloud computing and the major role of it is to reduce cost of IT services with increasing reliability, availability and flexibility and decreasing processing time. (Low et al., 2011)

According to Gartner (2009) computing style was defined as massively scalable IT-related capabilities and provided as a service to external customers using internet technologies. IT capabilities are requested, provisioned, delivered and consumed in real time over the internet. Cloud adoption is strongly correlated to companies that are more likely to use more hybrid processes. Private cloud involves companies to deploy enabling technologies that are known as virtualization and multi-tenant applications to create their own database that will be used during the working process.(Frambach & Schillewaert, 2002)

For a lot of companies industrialized or standardized services is less threatening than an overall move to cloud and the benefits that has cloud provokes them to move on this direction. This new model of business is wrapping around new technologies as virtualization, applications (SaaS), platform (PaaS), and hardware (IaaS).(Chen, Liang, & Hsu, 2015; Frambach & Schillewaert, 2002; Hsu et al., 2014; Mbuba & Wang, 2014)

From SaaS category point of view, process by which different software applications are used by the service provider as a rental over the internet, using cloud related resources released by Salesforce.com customer resource management (CRM), Google Apps, Oracle Siebel on Demand and Microsoft BPOS. For PaaS - that access a range of computer, database and storage functions within a virtualized platform provided over the internet and services

released by Salesforce.com, Microsoft Azure, and Google App Engine. And for IaaS category is the delivery of computer infrastructure as a service. It is a model in which an organization outsources the equipment used to support operations, including storage, hardware, servers, and networking components. The service provider is owner of the equipment and has responsibility for housing, running, and maintaining it. The customer pays on a per-use basis and services are presented by AMAZON.COM AWS, SUN NETWORK.COM, IBM Blue Cloud, and Verizon CaaS.(Low et al., 2011)

Term "cloud" has been taken from the idea of businesses and users being able to access applications from anywhere in the world on demand. Adoption of cloud computing can revolutionize the business scenario in different technological innovations, its facilities and resources could be accessed on demand.(Low et al., 2011; Rogers, 2003)

As in previous studies TOE framework is the main framework used by contributors of this research. Each stage of framework is reviewed separately and done carefully and with consideration of positive and negative effects during the adoption process.

Each papers reviewed above are doing analysis by understanding the contribution or the disadvantage of such a change.

When company is trying to adopt innovation and tries to build their conclusions on this framework they divide each context in separate parts. For instance in case of technology relative advantage, complexity and compatibility are the main determinants of the analysis. By using them it becomes possible to review the main determinants in this case.

In case of organization – Top management support, firm size and technology readiness are the basics of decisions. Top management supports means the attitude towards innovations and their knowledge in this direction. As in case of Hsu et al. (2014) we see here the same understanding of the concepts as before. (Low et al., 2011)

Firm size can be one of the most influential during the decision making process, because by consideration of the abilities of the company we can understand is for them valuable to move towards cloud? Are their resources enough to build their own place for the operations that

can be provided during the operations? Answering those questions can give to company much more information about this decisions than others.

In case of technology readiness we consider those resources of the company that they already have – intellectual as well as technological. It is one of the most interesting and hard part of the analysis that can be considered as application for the rest of the points listed above.

In case of environment all the authors using this framework are considering competitive pressure and trading partner pressure. (Low et al., 2011)

In case of competitive pressure - company is depended on global trends on their industry. This dependence tells them, (like an echo or direct talk) that market is ready for this change, to be competitive with other companies in this industry they need to take this step and improve their operations to follow the competitors. Or to take an advantage by acceleration in innovation adoption process.(Low et al., 2011)

Trading partner pressure means that the compatibility with partners. For all the companies that are involved in their trade or exchange are making different type of influences. If the firm has a partner with whom partnership must be integrated more, this kind of change might play crucial role.(Low et al., 2011)

In most of the papers listed above surveys are giving the information to make analysis depended on them. The tendency for each of research shows a similarities in different markets and different industries.

Usually companies that are adopting cloud are mostly in logistics or IT industry and the size of them is small or medium, as in our case, because of the privacy issues or other kinds of reasons big companies are tend to avoid this kind of changes.

Different authors have different results, in case of Low et al. (2011) to promote cloud computing adoption, it is necessary to clarify those factors that are keys to explain adoption process. Make analysis based on the industry, market and geography. The biggest question mark during the adoption process is the usefulness of it for the company, authors mean from

the POV of the firm. Failure downtime is another concern for SMEs to go and try to adopt it (Low et al., 2011).

In general, for hi-tech industry the most influential factors to adopt the innovation, and in our case – Cloud Computing are technological, organizational and environmental factors. For Low et al. (2011) relative advantage, firm size, top management support, competitive pressure and trading partner pressure are significant determinants of this process and complexity, compatibility and technology readiness are that are insignificant for adoption process. The most influential for a lot of authors during the move on cloud is the last one from the push points to adoption – trading partner pressure, because of the reasons that were listed above and relative advantage was the barrier for adoption as well (Low et al., 2011).

For different industries uses of TOE framework are different. For Lian, Yen, and Wang (2014) which reviews adoption process within the hospital in Taiwan is necessary to combine TOE framework with HOT-fit model (Human-Organization-Technology fit). As we understand the nature of cloud computing is kind of unification of information and resources that are partially delivered to participants of the organizational process. In case of hospital sector the concerns are directly connected to privacy and data security. Thus the division and organization of TOE framework needs to be different, and with consideration that all this must be combined with HOT-fit framework there is a need to review 4 factors – Human, Technology, Organization and Environment. Each factor indicates to the specific part connected to decision making process.(Lian et al., 2014)

In case of Human factor – CIO innovativeness and perceived technical competence;

For technology – Data security, complexity, compatibility and cost;

Organization – Relative advantage, Top management support, adequate resources and benefits;

And finally, for environment – Government policy and perceived industry pressure.

As we can some factors across the industries are the same. As we saw in Low et al. research, we see the same here as well, of course some parts, but it’s still significant: In case of

technology complexity and compatibility are common and relative advantage is moved to organizational part, where we see another common factor - top management support. In environment there is the same of industry pressure. For hospital sector factors like Government policy and perceived technical competence play very important role.(Lian et al., 2014)

Since cloud computing is relatively new information technology application, for many it's still unclear the use of it, benefits it can give to firm and advantages that comes with its adoption, including innovations in processes and operations.

Analysis of the surveys as we mentioned above needs to vary regarding to industry that researchers are looking at. For Lian et al. (2014) results implied that in case of Human factor, this dimension reflects the importance of information system level within the company. Two factors that were mentioned by us – CIO innovativeness and perceived technical competence have different type of influences. First of them implies about capabilities of information systems. As research shows it is second most important factor within the decision making process. Also another important moment that is constant across the industries is that any company must decide carefully and understand their information technology assets before making such an important decision. Human factor is another important factor that is constant information system human resources. Study shows that adopters are giving more importance to first factor than the second one. (Lian et al., 2014)

Technology dimension, as in other studies, usually has two main factors on which are depended mostly – data security and costs. For distributing environments security issues play crucial role in most of industries during the innovation adoption process and cloud computing is not the exception. In case of hospitals sector it is critical concern a studies have shown. Complexity and compatibility, as this and other researches proved are strongly correlated to information system human resources readiness and qualification to adopt it.(Lian et al., 2014)

Organization dimension usually has Top manager's support as most influential during making decisions whether or not move to cloud as well as adequate resources. Important note

for hospitals sector is less importance of relative advantage then in other parts of business reviewed. (Chou, 2015; Lian et al., 2014)

Environmental dimension became less important according to data reviewed than in other parts of the analysis.

Cloud computing is similar to an electricity grid that uses internet to share hardware, software and information with users that might be final consumers or intermediaries. Usually users don't know the exact location of the data. Depended on industry or sector or size of the companies varies framework used for research. In case of Gupta et al. (2013), tool used to make conclusions is Cloud Computing adoption by micro and small businesses framework. Most of the models for understand innovation adoption have a lot of similarities. The same is in this framework, where cost reduction, ease of use and convenience, reliability, sharing and collaboration and security and privacy are the main determinants. (Gupta et al., 2013)

Cost savings are one of the factors that have a huge influence for any business to make some steps in specific directions. For instance, according to statistics by McAfee (2011), about 70% cost reduction has been observed since adopting Amazon Web Services (AWS). By the way amazon reduced their price a couple of times for past three years, in spite of absence of competition. Pay-per-use part of clouding is one of the significant parts of cost saving functions of cloud computing. Tools like CRM from saleforce.com is becoming a lot affordable for companies that couldn't use services of this level. Startups and small businesses can use applications for Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and Supply Chain Management (SCM) due to economical subscription fees. According to statistics (Payton, 2010) European small businesses saved up to 80000 Euros annually by adopting just Google Apps (Google Docs, Gmail, etc.).(Gupta et al., 2013)

Ease of use and convenience is another factor that according to authors have high importance during research. Having access to data from any location is driver of mobility advantage of Cloud Computing. There is tendency of moving to cloud because of this, very important trend today. Companies are putting their accounting and finance work on cloud and it gives them

opportunity to spend more time on strategic issues and initiatives. Reliability is concern that has double effect for a lot of companies. The problem is in trust on abilities of the services suppliers to support their servers. Big concentration of data at one place stimulates people or group of people to attack on that source of information. This factor is strongly connected to privacy. On another side companies that are providing cloud computing for their customers have ability to use more resources on security issues and improve it way more than individual company with their own resources.(Gupta et al., 2013; Ratten, 2012)

Sharing and collaboration function of clouding attracts a lot of customers from different industries. Cloud file storage allows SMBs stakeholders to share information and data, store and share them across the web. Good examples of them are Google Apps, Box and Jive. (Gupta et al., 2013)

As in all other researches, the most important is security and privacy threads. According to Payton (2010) organizations talking about privacy are more tend to be concerned about their own control than other serious issues. In this case trust is more important factor than problems of clouding from this side. In general Security and privacy are strongly correlated to cost reduction function of this tool and also are positively related to reliability.

As research have shown various inter-relationships exist between those five core variables that were considered the most important. The most correlated by this research was the positive correlation between ease of use and convenience in using cloud and sharing and collaboration with other SMEs.

To deliver technical and economic advantage, cloud computing must be positioned and implemented successfully. Deployment replaces implementation, because simply make use of the services of a cloud supplier does not by itself differ a company from its competitors. Successful usage denotes the realization of unique organizational benefits that are a source of being different and competitive advantage.(Chang et al., 2013; Hsu et al., 2014)

Chang et al. (2013). paper presents the steps that leads to the CCBF, and demonstrates it as a working framework as a whole for companies adopting Cloud Computing and explains different areas within the CCBF work. For this he uses several frameworks and uses them

for analysis. Those frameworks demonstrate that the business model is strategic and acts on the top of operational levels of Cloud Computing. Authors use two types of approaches: The top-down approach defines requirements and presents strategic direction. The bottom-up approach is influenced by the business model and focuses on delivery of services, where revenues/benefits are crucial for businesses.

They are defining with this model four key areas, which are (i) Classification; (ii) Organizational Sustainability Modelling; (iii) Service Portability and (iv) Linkage. Organizational Sustainability Modelling is defined in terms of the Organizational data required for the CCBF.(Chang et al., 2013)

Conceptual model of Mbuba and Wang (2014) provides a tool for SaaS adoption and organizational change by dynamic change process analyze. More and more organizations are adopting or considered adopting SaaS applications to replace on premise systems. Sales of SaaS applications were over $14.5 billion in 2012, an increase of 17.9% from 2011 (Gartner, 2013). Because of budget constraints and the demand on computing, Information System scholars believe that there will be global shift to using SaaS -based resources. So there is need of understanding SaaS adoption on organizational. Model explains how SaaS adoption can change IT employee's roles, tasks, and structure of IT department. It explains both technological and organizational constructions into SaaS business processes, what tasks can could bring about developing structures. So this paper gives us knowledge about following empirical examination on the dynamic of changes. The conceptual model could give managers an information on opportunities they have, risks to avoid them and changes to an organization. (Mbuba & Wang, 2014)

For Oliveira et al. (2014): "Cloud computing is an important evolution of IS technology. It boasts attractive properties such as agility, scalability, pay-per-use, and cost efficiency". And their study "sought to identify the determinants of cloud-computing adoption based on innovation characteristics and the technology, organization, and environment contexts of organizations. A research model was developed that integrates the DOI theory and the TOE framework". Evaluation of model was based on Portuguese firms. And was used two distinct sectors: manufacturing and services. The results of analysis showed effect of cost savings on

the competitive advantage of cloud computing and its effect on cloud-computing adoption. Also that the manufacturing and services sectors have different motivators of cloud-computing adoption. Research showed that in the adoption of new technologies, a scientific approach (TOE) contexts of the organization along with the innovation characteristics is more holistic and meaningful in providing valuable insights to practitioners and researchers. (Oliveira et al., 2014)

For F.-K. Wang and He (2014), Cloud Computing is associated with "high scalability, agility, high availability, high reliability, virtualization of technology, multi-sharing, services in pay-per-use mode (utility computing), and automated resource management ". These characteristics make cloud computing an attractive and commercially viable for small enterprises. However, there are some risks such as data security, privacy, compliance, and vendor lock-in. SMEs have to weigh pros and cons and decide what cloud-based services are the best to adopt.

Hsu et al. (2014) suggest more case studies to understand why and how SMEs adopt cloud computing. They are interested in cloud adoption intention, and are using TOE framework. In their theme pricing strategy results in part from a cost–benefit analysis, "deployment strategy results in part from risk analysis, are important issues that previous cloud studies have are not often investigated". It also contributes to cloud adoption literature by investigating the multifaceted nature (i.e. adoption intention, pricing mechanism, and deployment model) of cloud (Hsu et al., 2014).

All of the studies we listed above have strongly connected with the result, this thesis goes for. Main findings of them are vitally important to create something that gives directions for the companies that are working on cloud based products and for companies that are trying to adopt them. Hsu et al. (2014) Hsu et al. (2014) Hsu et al. (2014) Hsu et al. (2014) Hsu et al. (2014)

Oliveira et al. (2014) are mostly using very similar methods to make it possible understanding adoption process, reasons and ways from the small and medium sized companies. By the result we can say that for companies that are small or medium sized, the

main and most important factor for moving to clouding is cost reduction and elasticity of the products that are delivered from the suppliers.

F.-K. Wang and He (2014) research uses case studies for understanding the nature of the adoption clouding by SME and identifies in it several key factors for SMEs. This case study proposes a cloud service strategy matrix. And can be helpful for small cloud service providers to focus on strategic points.

Of course Cloud Computing has its disadvantages as well. Biggest issues at the moment are Data security and privacy. We can often hear from the representatives of the companies that are on the dilemma adopt or not clouding questions like: “Why should we give cyber criminals all data concentrated in one place? It motivates them to break the system and get the information which they wouldn’t get without doing it...”

Opinions like this have their logical background and now every company in this sector tries to improve all those minuses that can exist during business process.

3. Description of the case study company and the country it operates in

This chapter represents review of the Country and the company that will be used for the TOE framework analysis. Most of the information from the country section will be used to develop environmental context analysis and from the company review for the organizational context analysis.

3.1. Country review



Georgia is post-soviet country that obtained independence about 24 years ago. For this period changes, as in most of states with the same past was very rapid and non-predictable at some level. Political instability, corruption and wars were the main reasons of problems in developing the economy. For the past decade the main changes came bringing with them changes in all of the system responsible for economic growth. Here are some brief information about the main indicators of the country at the moment:

GDP (current US$)	$16.53 billion
GDP (per capita US$)	$4,433
Population, total	3,7 million
HDI (Human Development Index)	0.744
Starting a Business (Worldwide rank)	5
Dealing with Construction Permits (Worldwide rank)	3
Getting Electricity (Worldwide rank)	37
Registering Property (Worldwide rank)	1
Getting Credit (Worldwide rank)	7
Protecting Minority Investors (Worldwide rank)	43
Paying Taxes (Worldwide rank)	38
Trading Across Borders (Worldwide rank)	33
Enforcing Contracts (Worldwide rank)	23
Resolving Insolvency (Worldwide rank)	122

Table 4 - Notable statistics about Georgia (doingbusiness.org)

Table 4 represents important statistics about the country. In case of doing business Georgia is one of the top 20 out of 189 countries. The indicators that are giving this rank to the country consists with several important measures mentioned above, in the table. For starting business Georgia is the leader of the region and one of the leaders in Europe, as well as in dealing with construction permits.(IMF, 2015) The last one means that since there is no modern and valid infrastructure for enough quantity, government tries to make it easy for investors to build new buildings, roads, resource centers etc. For past 10 years it had big impact on the economy, since international companies came to invest in this sector(World_Bank;, 2014).

Especially in touristic zones. For instance in Batumi, one of the cities of Georgia, after deregulations and De-bureaucratization increased several times. Brands like Hilton, Holliday Inn, Kempinski, Sheraton etc. opened their branches and invested a lot of resources for development of their services. This changes had influence on energy sector as well, where new investments began to flow.

Since Georgia is on the crossroad of the Europe and Asia, there was a huge need of developing and sometimes building new roads and regional infrastructures, to support transitional function of the country. With foreign investments registering property is also one of the most important measures. In this case Georgia has the first place among the other countries, according to the international organizations. To register a property physical person



Figure 2 - Ease of doing business (doingbusiness.org) – Doingbusiness.org

or company needs just one day to do all the things that are necessary for it.

Easiness of getting credits is another important motivation for the investments (Figure 2). Among other countries that are the most attractive for investments, Georgia got 7th place. (IMF, 2015)

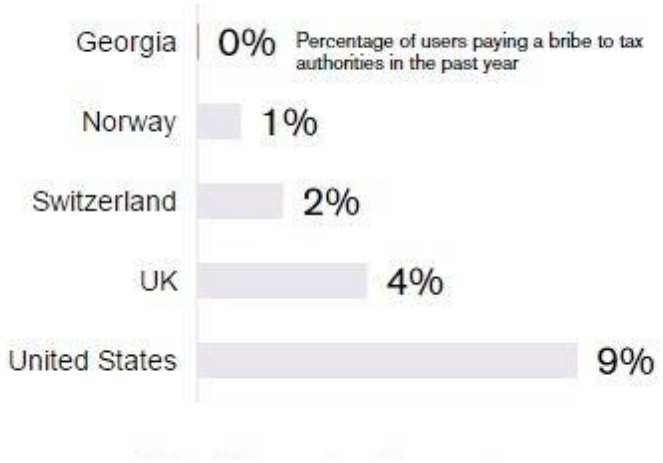


Figure 3 - Global corruption barometer Transparency International 2013

According to the Transparency International research Georgia is one of the less corrupted countries in the world (Figure 3). In everyday business life there is practically zero chances to face with corruption on administrational level. Usually most of the post-soviet countries have issues in this direction. The reason is that transition from past economical system is still not finished. Issues related to corruption are one of the main problems of the region and for improvement of it are used a lot of resources by international organizations.

Research of the Heritage Foundation (2015) have shown that Economic Freedom is one of the advantages of Georgia as well. To compare with its neighbors (view Appendix). As well as corrupted, autocratic regimes is also frequent case in post-soviet countries and of course it has influence on the economy as well. International organizations are providing their conclusions based on this measure as well.

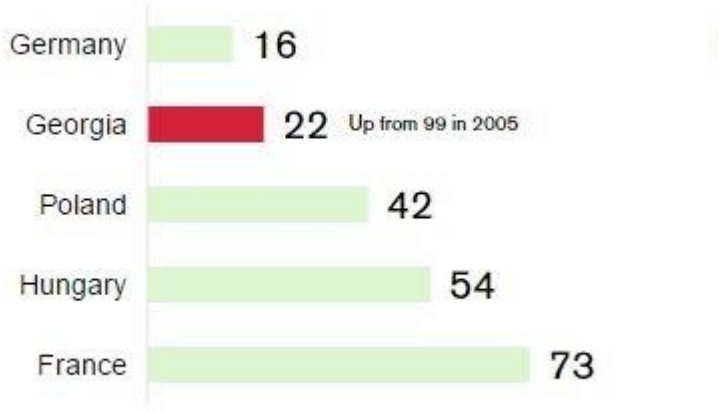


Figure 4 - Index of Economic Freedom – The Heritage Foundation, 2015

As we can see from the Figure 4, in case of doing business Georgia is one of the leading countries and the reason of it is the government policy, to attract international companies to invest in Georgia. According to statistics provided by international organizations (IMF, World Bank, etc.) that are providing different types of studies about the country the main problem of doing the business is protection for the investors. In case of registering property, dealing with construction permits and starting a business Georgia is represented as a leader among other countries that gives stimulus to investors to put the money into the economy. In case of taxes there are six main types of fees that are feasible for our case:

- Income Tax – 20%;
- Profit Tax 15%;
- Value Added Tax (VAT) 18%;
- Excise Tax (depends on type of business);
- Import (depends on type of products imported);
- Property tax (Lands or buildings, if they exist)

The reason of review of the country was to see the global situation in the country, environment for doing business and challenges that need to be overcome (doingbusiness.org).

So we can conclude that Georgia's competitive advantages are:

- Its geographical location, which gives it an important geostrategic position since the oil pipelines transporting Caucasian oil to Europe all pass through its territory;
- A low corporate tax rate;
- Simplified company registration procedures;
- A government that wants to attract foreign investment, and takes appropriate measures.

The country's main weaknesses are:

- The limited domestic market;
- The instability of its relationship with Russia; and
- The corruption problems that might affect the country on the top level.

The Georgian government has established a range of measures in order to develop the country's economy:

- The privatization of public companies;
- Establishing a principle of non-discrimination between Georgian and foreign businessmen;
- Drastically reducing the procedures for forming a company;
- Reduction of corporate tax; and
- Liberalization of the employment market.

3.2. Company review



Figure 5 - Foodservice logo

Foodservice was founded at 2006 and after is successfully operating on Georgian market. The main aim of the company is to buy, distribute and logistics of the food products, also to import products from different countries, that are ecologically clean, tested in labs and certified. The company is one if the leaders of the logistics and distribution on Georgian market.

The goods and services offered by the company are available all around Georgia. The firm has quite big transportation resources that helps to do all required operations to reach the main aims in biggest cities of the country.

Foodservice has warehouses in different regions of Georgia, which are satisfying modern trends and requirements of the market. The company was the first local firm that set European standards of warehousing and packing. Central stock of the company has 7500 m2 area and is provided for dry products to be kept. Also the refrigerator that is dedicated for products that need to be kept on certain temperature in dry or frozen conditions. Temperature regime is protected all the time: from +8°C to +10°C for dry and -25°C for frozen products. Warehouse works in semi-automate regime and has modern technologies for reloading and other activities required to operate successfully.

Company has long term partnerships with Georgian retail companies that are leaders of the market: Goodwill, Ioli products, Kanti, M Group, Teliani valley, Sante etc.

The services they provide are divided by two parts. Company has presellers with cars and expeditors with trucks that are delivering products to customers. Presellers have IPAC tablets that they are using for reserving and ordering the goods directly from the warehouse. The warehouse is collecting orders and on another day company delivers products to clients. Their auto park is operating with GPS system tools that allows opportunity to control any car and plan the tracks for employees.

To improve sales trainings and different types of activities are required, so the company has its own trainer and tries to improve in this direction as well.

More than 6000 retail stores are their partners and quality of service they provide is increasing.

As foodservice states, the main objectives are to provide optimal route, revise and time check permanently on products that are on a way to final destination. Informing clients about conditions of orders and their locations.

The Following Figure (6) shows the logistic process of the company:

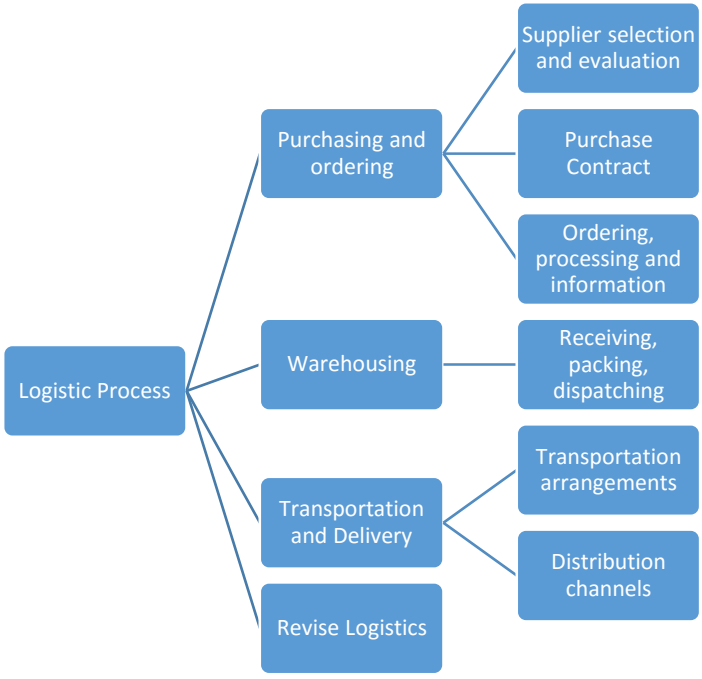


Figure 6 - Logistic process within the Foodservice ltd

As it can be seen on Figure 6, the process consists of several stages. First and one of the main requirements for the operating is purchasing and ordering, which are referring to all of the buying process. The main aim of this activity is to:

- Offer materials to suppliers and essential services for the organization;
- Minimizing inventory and investment costs;
- Keeping quality standards at high level;
- Find vendors for component goods;
- Improve competitive advantage of the company;
- Keep relationship with clients long-term.

From the foodservice point of view during the purchasing and ordering activities there are three main factors that are the most influential:

- Supplier selection,
- Quality control and
- Forward buying.

The first of them reduces costs and improves logistics, the second provides best services to customers and satisfying their needs and the third helps to build long-term partnerships. (Bowersox & Closs & Cooper, 2010)

Choosing suppliers is one of the most important processes. It is complex and includes decision makers and decision influencers (Managers and responsible persons that are not directly responsible for decision making but have influence on it) which are the part of decision making unit. (Cooper 1994, 258).

Foodservice firstly uses evaluation system for its suppliers with several factors: registered capital, production areas, equipment, staff, main products, main customers etc. Technological capacity, stability of supplies, reliability of resources and comprehensive competitiveness are

other important factors for them. Purchase contract, is another important factor for Foodservice to make decisions about suppliers.

Ordering processing and information are one of the main issues for the companies in this industry (Cooper 1994).

Warehousing is another stage of logistic process. It is any location used as a stock of materials through the supply chain. Warehouses are some kind of link between producers and customers (Waters 2003). It is one of the most important parts in logistics industry and system. We can refer it as a key point for companies to plan and research before they produce their products. There are three main functions of warehouses: Storage, movement and information exchange (waters 2003). As we mentioned above, Foodservice has well designed all of those functions and has certificates from ISO of standards that are satisfying all the needs required for successful delivery of the functions required.

Packaging as one of the components in logistics system, has a close relationship, with transporting, warehousing, delivery and distribution processing. Packaging is the end of production process but also a beginning of logistics activities.

Good packaging can have a positive impact on layout and design and overall warehouse productivity (Bowersox & Closs & Cooper 2010, 269). Foodservice uses different types of packaging standards and is one of the outstanding at this directions on local market. Two basic functions of the marketing and logistics (Bowersox & Closs & Cooper 2010, 272).

Another important factor for the company operating in distribution and logistics system is transportation, which means in itself movement of goods from point of origin through the supply chain. It is physical movement of materials and thus makes it in certain distances (Waters 2003). Transportation service has specified characteristics: Dependability, time-in-time transit, market coverage and flexibility (Waters 2003). There are a lot of ways of transporting goods from one place to another, such as air, rail, water, pipelines, motor. About 80% of operations in delivery by foodservice is by motor. As we mentioned above the company has well organized auto park, with more than 600 cars and trucks.

In the next chapter, we will discuss methodology of the case study and analyze why those questions that were asked became important for our research.

4. Methodology and Data

4.1. Introduction

The following sections are about the methodology used in the case study and on the process of gathering information. The aims of the study are to understand the drivers of the move towards the cloud for a Georgian logistic company, to analyze the changes required (if any), to make recommendations to the firm, and to evaluate changing the process.

In order to explore these questions we decided to use qualitative research analysis on the primary data obtained from a survey and face-to-face interviews. Then put it into the corresponding framework and draw some conclusions regarding the results obtained.

4.2. Methodology

As we understand from the TOE framework name, it considers three main context during analysis: Technological, organizational and environmental.

Technological context explains internal and external technologies that are relevant to the firm. For this it's important to take a few steps.

First of all, one must understand the characteristics of innovation: detailed plan of implementation, the methods that will be used by engineers to change business processes, the ability of integrating innovation with the system that are in place, and the technical criteria to measure implementation effectiveness (Lin & Chen, 2012).

The second step is to develop measures that allow to find out if the implementation is effective. This will be followed by planning and placing innovation and designing or redesigning the organization.

Another important step includes changing human resources policies and designing or redesigning job descriptions. Then it follows the installation and integration with the existing system.

The company size, the complexity of its structure, the quality of human resources, the amount of slack resources available internally, the decision making and internal communication methods, among others, are part of the organizational context. Top executives can energize major organizational changes by developing and communicating a clear image of the firm's strategy, its values and the importance of technology to reach the main goals, as well as creating a team that will be responsible for crafting a vision relevant to the innovation.(Ghaffari, Delgosha, & Abdolvand, 2014)

The surroundings of the company, i.e., competitors, suppliers, industry members, customers, the government, the community, are considered in the environmental context. They are influencers on the firm's interpretation of the need for innovation and its capability for deploying it, since they can support or block technological innovations. Changes in market can drive the firm to implement different forms of innovations. Governmental regulations can demand it from the firm and also customer companies with bargaining power can also influence this processes (Hart O. Awa, 2012).

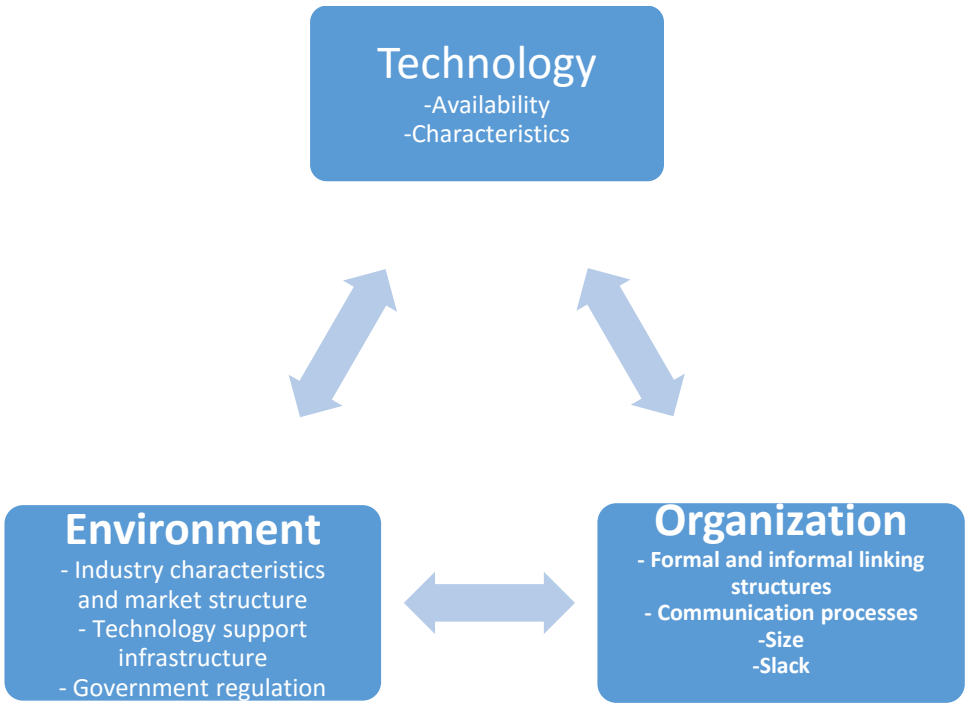


Figure 7 – TOE framework

4.3. Data Collection

The primary data was collected via survey and face to face interviews with Foodservice representatives. The survey has three main parts. The first part is about the company itself. The second and third parts are related to Cloud Computing and including questions on drivers to changes, and challenges and issues in performing this change, respectively.

The first part of the survey aims at understand the company, thus the questions are about the position of the person answering the questions, quantity of employees, experience in IT and in experience in Cloud Computing, if any.

Part 1: Company

What is the size of the enterprise you represent?

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

Are you a decision maker?

- Yes
- No

Knowing that experience in IT and Cloud computing can be one of the main factors influencing cloud adoption, it is important to find out if such knowledge exists and its source.

Experience in IT (as user, in years)

How did you get know about Cloud?

- Advertisment
- Partner organizartions
- Competitors
- Friends

Experience in Cloud Computing (in years)

email, software, server, platform, etc.

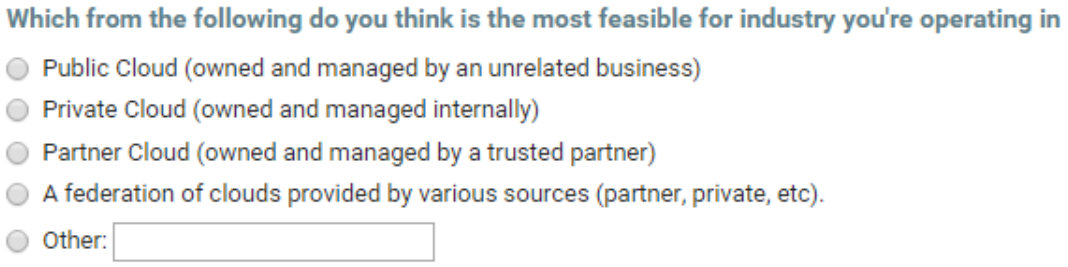
- 0-1
- 1-5
- 5-10
- more than 10
- None

The second part is about the perceived benefits of adopting cloud services and their attitude towards it. Thus, the questions are on type of services and clouds used; or otherwise deemed interesting.

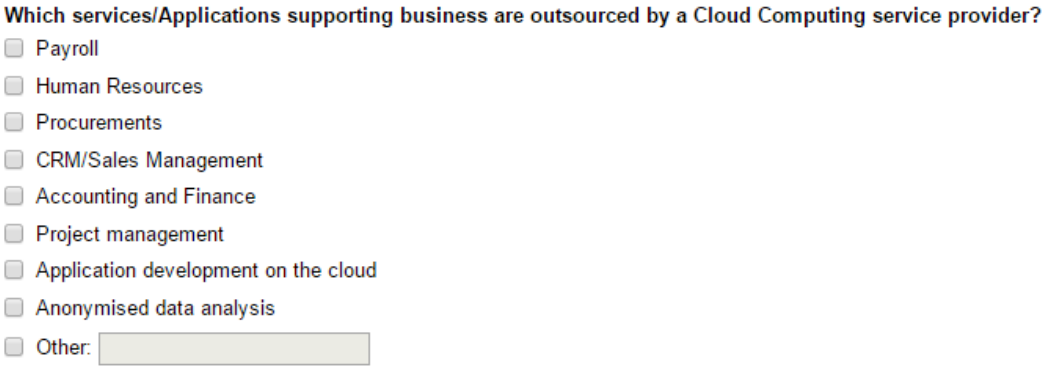
Part 2: Drivers

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)
- Security services in the cloud
- Other:



In addition, it is also important to know in which area the company is using or plans to use Cloud Computing. It will help us to understand the most important factors for adoption and in which of the part of business is meant to be implemented.



Finally, it is important to know which are the main benefits the company has been experiencing or expects to obtain from cloud computing. A list including the most common key factors is provided and each should be rated on a 1 to 5 scale, where 1 corresponds to low and 5 corresponds to high.

What were the main reasons of adopting Cloud Computing?

	1 (Low)	2	3	4	5 (High)
Flexibility and scaliability 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	○	○	○	○	○

Part 3 is about concerns. They play an important role in any decision regarding change and could computing adoption is no exception. Some of the concerns have to be addressed before hand, while others will be dealt with if and when they appear. Some of the most common concerns are 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, unclearness of pay-per-use scheme, concerns about variable cost that can be uncontrolled, cost and difficulty of migration to the cloud (legacy software, etc.).

What were your main concerns from your point of view to Cloud Computing?

	1 (Low)	2	3	4	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 trans national 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...)	○	○	○	○	○

As mentioned before, we have also had face-to-face interviews. The objectives behind conducting these interviews were twofold: firstly, they allow us to gain a deeper understanding of the company structure, modus operandi, and attitude towards innovation. Secondly, they provide us with the opportunity of understanding context in which the answers to the survey were and also to explain the responder what was intended with the questions. We acknowledge the company collaboration and in particular the collaboration of Lasha Gotsiridze (Procurement and Logistic Manager), that not only answered the survey, but also made himself available to meet us for further questioning and to show us the company.

5. Case Study

5.1. Data Collection

As said before, the data were collected by survey and face to face interview with senior representative of the company. The reason to make face to face interview was to understand clearly why interviewer answered those questions in a way he did. A summary of the results obtained is presented in the Table 5:

Size of the company	More than 600 employees
Experience in IT	5 years
Which type of cloud services are the most useful for you?	Platform as a Service
Which from the following do you think is the most feasible for industry you're operating in	Private Cloud

Table 5 - Facts about Foodservice ltd

As then be seen, the company has more than 600 employees and some experience in IT. Company has a small department of IT that at the moment is supplying the company's needs.

Regarding future adoption of Cloud services they think that the Platform as a Service option is the most interesting one, because of the specifics of the software they use. They would choose a Private Cloud since, the privacy and security requirements.

The next section was about the reasons of adopting Cloud Computing. The main factors were chosen by according to papers that were reviewed section above. Those are:

- 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;

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 6 - Main reasons of Cloud Computing Adoption

As we can see from the Table 6, Flexibility and scalability of IT resources, Mobility and Regular backups were the main benefits company expects from the cloud computing. (Table 6) As interviewer said, since the industry they operating in is highly connected to regular move and requires time efficiency, the reason why they want to adopt cloud is directly connected to those factors. Second and also very important factor is agility, also supported by the logics they mentioned above. Minor, but also valuable factors are avoiding capital expenditure and increasing computing capacity.

Less importance for the company is greener way of managing IT. According to Hsu et al. (2014) this factor is usually not as important for the small companies as for the big ones, because of the higher responsibility of them and reputational issues that might have influence on attitude of the clients towards 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 7- Main concerns about Cloud Computing

In case of concerns (Table 7), since company wants to adopt computing from the local company headquartered in Latvia – DPA Georgia, are higher than if they would try to implement it from the global leaders like Microsoft, Amazon etc.

The reason why the Foodservice management decided to use their services are a few but important factors for the company:

- Price;
- Human factor;

In case of price, the offer DPA gave to Foodservice included several important points. In case of price the main benefit was in support of the security and issues connected to the migration to the cloud. Direct contact to management of the company and personal trust are parts of the human factors. As interviewer mentioned with the top executives of DPA they have long-term personal friendship.

The most important concern for the foodservice as we can see from the chart is security incidents (Table 7). Usually small companies have less resources than big companies, thus

all the incidents and threads that have cloud in general, has higher risk in small companies than for example in big, global companies like Microsoft or others.

Cost and difficulty of migration to the cloud, privacy, confidentiality and loss of control on services and/or data are also highly important issues for Foodservice. Company has all its data on local hard, has built the system and changing it will be more or less hard for them. In case of privacy and confidentiality their concerns are connected to environmental issues, like interests of government or the business groups associated with government might have some power over the service provider from different channels.

Less important factors are suspicion over the variable costs, pay per use and inconsistency between transnational laws. The reason of it as they mentioned is that in case of financial accounting and in general counting of expenses they have highly qualified human resources and the personal communication with representatives of the DPA is giving them opportunity better understanding of issues that might appear in this direction. Trans national laws are not the problem, because the company is operating in Georgia and for the next 5 years is not planning to reach international market.

Another important factor for the adoption of the cloud services is readiness of HR to use effectively cloud services. As interviewer said, they will try to solve this problem with different type of trainings and manuals that must improve knowledge of use of the benefits of the cloud computing.

5.2. Data Analysis

Questions sent to Foodservice Georgia was answered by its senior manager. According to answers company has more than 600 employees. As we saw above company is in providing logistic and distribution services. Questions were separated by two main types of characteristics needed to make analysis and they were used in Technological, Organizational, and Environmental analysis.

5.2.1. Technological context

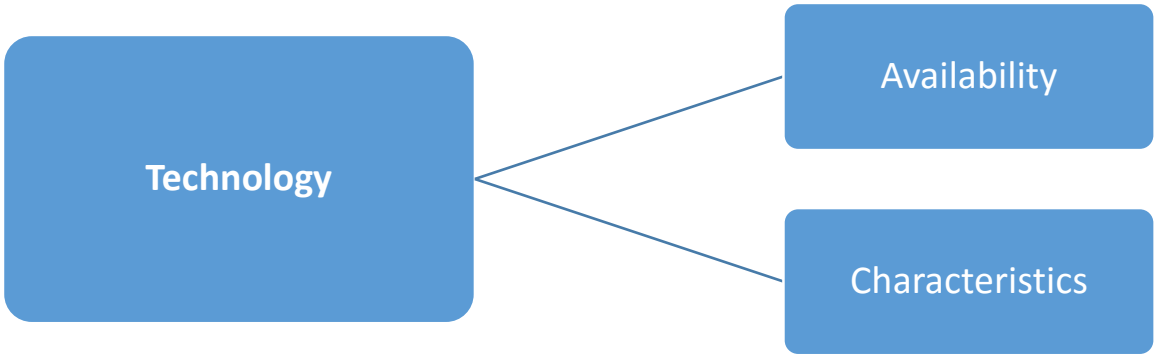


Figure 8 - TOE framework - Technological context

As we declared in methodology part, each context has its strengths and weaknesses. In case of Technological context of TOE framework (Figure 8) we declare both of them separately.

We divided all the benefits of the company into two parts: Perceived Usefulness, Perceived Ease of Use.

Perceived usefulness:

- In case of business performance usefulness the main factors that can be important for the Foodservice based on their answers are:
- *Flexibility and scalability of IT resources* – The main benefit for the logistics company is information instantly appearing into their working data. In this case Foodservice would have opportunity to improve their operations. Clouding gives

opportunity to participants of the operations instantly see and react on the changes or data received.

- *Greater IT efficiency and agility* - Smaller firms are nimble and thus more easily able to move to the cloud and take advantage of cloud computing's many cost-saving benefits.
- *Improve flexibility and mobility*. Users can change direction without serious "people" or "financial" issues at stake. Their operations quite often are not supported by some specific time, so there is possible that transaction might be done but until the next day it will not be possible for responsible person add or edit it in a way transaction requires. Mobility will give opportunity to avoid issues related to this topic.
- *Business continuity. Regular backups and disasters* – As representative of the company said a lot of problems were appearing in information loss direction, thus the technology with this kind of abilities will be a lot useful for them.

Perceived ease of use:

Clouding gives opportunity to company to do things much easier. Important factors listed above are another. As we mentioned above after trainings and educational programs for the employees' benefits of ease of use will be increased significantly.

Another important uses of cloud computing viewed by interviewer were:

- *Achieve economies of scale* – increase volume output or productivity with fewer people. Cost per unit, project or product plummets are less than before.
- *Reduce spending on technology infrastructure* - Maintain easy access to user information with minimal upfront spending. Pay as you go (weekly, quarterly or yearly), based on demand.
- *Streamline processes* - Get more work done in less time with less people
- *Shared computer resources* - Instead of wasting precious and costly computing power, an inherent drawback of the current client server model, cloud computing allows for a more efficient and affordable use of computing resources

- *Growth in cloud services* - Cloud services will continue to grow with increasing competition from both established players and new entrants. Some observers estimate that the cloud market will top $270 billion in 2020 with SaaS offering more growth opportunities than any other segment. (Gartner 2013)

Technological weaknesses from the clouding are

- *Lack of liability of providers in case of security incidents* – Concentration of the information at one place stimulates hacker groups or other outlaws to break to the data center and download files that might have high value.
- *Loss of control of services and/or data* - Small and medium-sized organizations are more likely to embrace the benefits of the cloud than larger companies which may have complicated legacy systems.
- *User attitude and control* - Organizations will still need to have 'control' over data and information to meet business, legal and regulatory requirements. For many, the idea of giving up control of the hardware that carries business critical data and outsourcing confidential customer data to a third party is an unsettling concept.
- *In house IT Personnel* - Many IT professionals will need to re-invent themselves as organizations do away with expensive IT Departments.
- *Privacy (Data Protection)* - European Union (EU) law states that organizations can only transfer data outside the EU if that country's data protection laws are adequate (to European standards). With cloud computing, you don't know where in the world your data is held even though you are still liable for it.

5.2.2. Organizational context

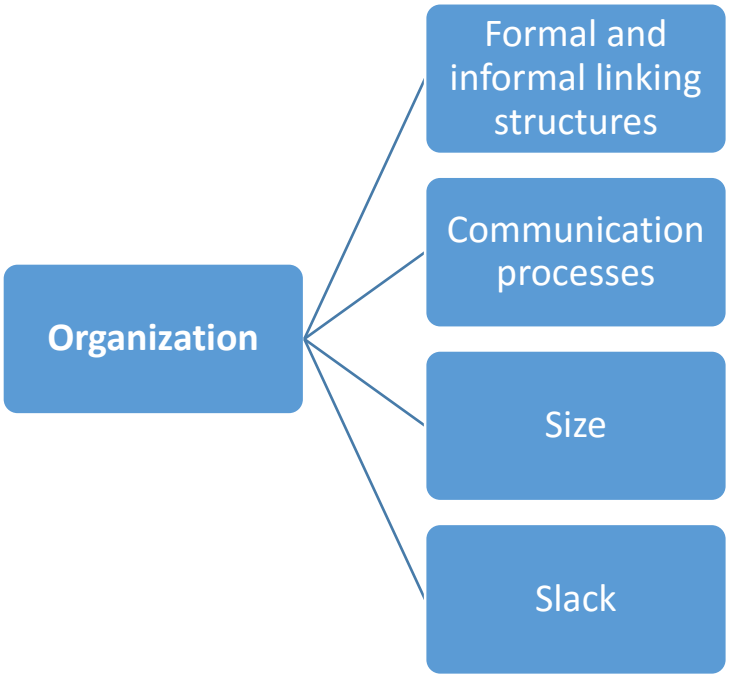


Figure 9 - TOE framework - Organizational context

Strengths

- Foodservice is Logistics Company with significant experience and strong brand name in Georgia - usually international organizations have much more resources, since they decided to grow, they have higher opportunities their competitors
- *Strong quality and grow in recent years.* As I saw after interview quality control is in higher stage of the development. Company has internal policies to control and revise all the services they provide.
- *High will towards innovation adoption* –Interview with representatives of the company and knowledge its internal attitudes towards the technologies gives me opportunity to conclude statement above;
- *Scope of business operations* – Foodservice is operating in distribution industry of goods and services and has high experience in organizing effective operations structure without advanced technological solutions, like cloud. It is one of the leaders

of the industry and the structure they implemented through their operations are one of the reasons of it.

- *Organization mission* – As on interview was said company has mission to be a partner with industry by providing warehousing and transportation services that meet the customer's expectations of quality in service, productivity and cost. Since providing this type of mission requires diversification of services that will improve control over the operations and this is one of the drivers of change.

Weaknesses

- *Integrity of services and/or data* – Foodservice has IT base, but level of deployment of it is pretty low. Software they are using at the moment has specific technological problems that might have influence on decision making process.
- *Human resources qualification* – Since the main users of the service implemented should be drivers and other representatives of the company, which never had a chance to use sophisticated software through their working process, which might be one of the problems.
- *Marketing Budget Marketing* is a key factor in promoting products and services to customers. If a business lacks the budget for marketing, this is a major weakness that can affect how much of the market share a business acquires, and how high its sales are from quarter to quarter.
- *Still small organization to compare with competitors* – Some competitors are a lot larger in industry, company operates in. Since that capabilities of doing some of the services that can be not as effective as from other participants of the market.
- *Cost and difficulty of migration to the cloud* – According to the answers from the survey the costs are one of the main determinants of the decision making process. DPA made some kind of discounts, they have close personal relationships, but still, migration on cloud requires a lot of efforts, including because of legacy software and other factors.

5.2.3. Environmental Context

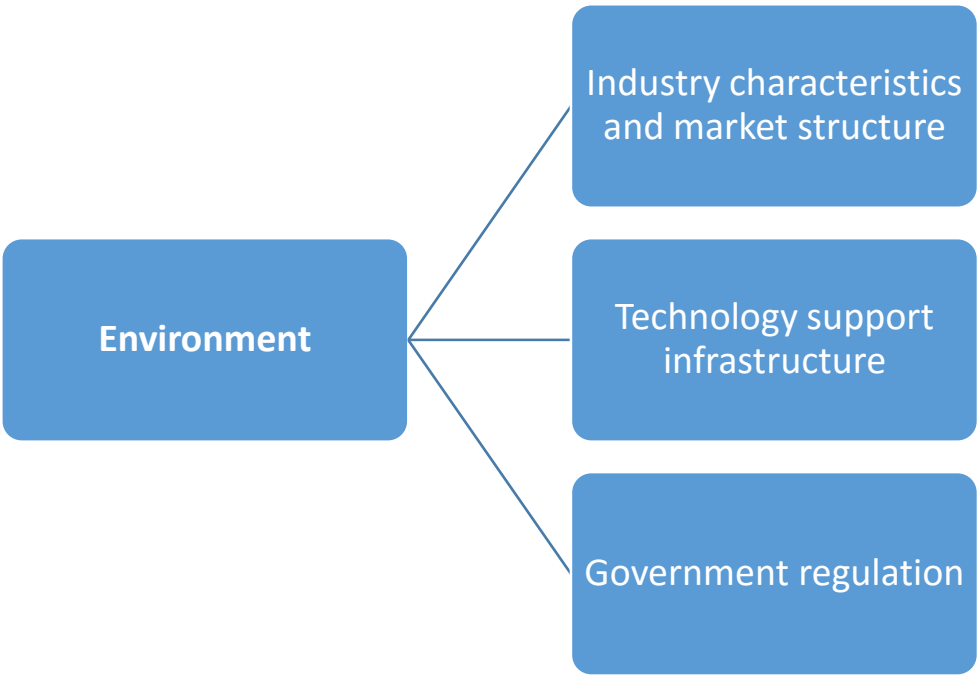


Figure 10 - TOE framework - Environmental context

Strengths

- *A low corporate tax rate* is one of the positive sides of the market that makes doing business easier than in case of high rate of charges. As we mentioned above Georgia is one of the leaders in this direction.
- *A government that wants to attract investment and takes appropriate measures* – For the past decade had developed all those regulations that makes doing business easier than. In ranking of doing business Georgia is one of the countries where to build company and work efficiently is easy.
- *Low rate of corruption – In lower level* of the bureaucracy there is the lowest rate of corruption. Company can work and do all work they need to do without facing with issues related to it.

- *Fast growing market* – Tendency in Georgian market of IT is fast growing. For the last year's government and private sector created demand on the information technologies across the country.

Weaknesses

- *Absence of knowledge of cloud services*, company that might be useful for the operations.
- *The limited domestic market* is one of the most important issues facing with local companies while doing a business in Georgia. There is high rate of migration in EU countries as well as in US.
- *The corruption problems that affect the country on the top level* – Government procurements and other types of investments are viewed as suspicious by international organizations and local companies.
- *Absence of infrastructure supporting technology* – Georgia is post-soviet country with once strong economy, but as we mentioned above the infrastructure that exists is too old or sometimes even doesn't exist for specific kinds of technology use.
- *Monopoly of the internet providers* that can add more barriers of the working process in the cloud – Connection problem is one of the main issues for the clouding. Georgia is no exception. Companies that are providers of internet usually are providing different types of services related to the field company operates in. Sometimes fair play principle is not applied by them
- *Recent problems of electricity* caused by irrelevant tariff policy of the government.

5.3. Discussion

The results we have obtained show positive effects of adopting cloud computing. In addition, they also show the main challenges from the company point of view, which the company needs to overcome to be able to enjoy all the benefits of the Cloud Computing, especially the ones that are highly valuable for the Foodservice ltd.: Flexibility and scalability of IT resources, greater IT efficiency and agility, business continuity - Regular backups and disasters, and mobility

Regarding the analysis, we can now understand, which are the main technological, organizational and environmental factors that have influence on the adoption of Clouding by Foodservice. According to the answers company provided, technological stimulators to innovate are: Flexibility and scalability of the IT resources, which allows the company to be more successful at the operational level; Agility and efficiency of IT resources, that brings cost savings and; Mobility that for a distribution company is one of the most important aspects; Business continuity and regular backups that give provide safety and gives the company representatives control over the timeline of operations made.

In case of organizational context the main supporting factors of innovation adoption are scope of the operations Foodservice has, mission of organization that includes in itself to be effective and thus has high importance towards adoption process and high will of management towards innovation adoption.

Environmental context has several important factors that can influence the decision making process. The main motivation for doing investments, in general, is low corporate tax, which has influence on Foodservice as well. Easiness of doing business and transactions are also very important factors. The Government of Georgia has different types of projects for innovation support, the most important being the Information and Technology agency of ministry of Economics and sustainable development that changes rules towards the innovation adoption regulations and makes easy to go to this direction. Market characteristics

are also important. A few competitors of the company have already implemented Cloud Applications.

There are threats and challenges that are distracting factors during the decision making process in each of the stages of the analysis. Technological weaknesses or threats that are the most influential are mainly security reasons that affect cloud in general and especially small cloud service providers. Another important issue for the company is ability to transfer the data to the cloud and applications that they are using at the moment. The organizational issues that might be the most problematic, during the adoption process, are human resource qualifications and cost of migration to the cloud, which is directly correlated to the size of the company and its abilities to support expenses during some strategic moves. Environmental challenges that the company might face are absence of knowledge of cloud use from the partner organizations, usually from the small ones, which sometimes have never used this type of services. Another important factor is monopoly of Internet providers and coverage of the network throughout the country (4G, Wi-Fi etc.) which is directly connected to the main benefits of the cloud..

6. Conclusions and Future research

This chapter summarizes the results from the analysis and answers our main questions. The chapter is divided into two parts. In Section 6.1 we provide the main findings and the recommendations to the company studied, while in Section 6.2 we point out some future research directions that can be used to improve and extend this work.

6.1. Conclusion and findings from the analysis

This study involves a Georgian distribution company, which is considering to adopt Cloud Computing services, more specifically Private cloud PaaS service. The primary and secondary data were qualitatively analyzed by resorting to the TOE framework. Our findings allow to answer the main questions of the dissertation, i.e., which are the main drivers to the adoption of cloud computing and which are the main challenges that the companies are expected to be face with. We also try to balance the advantages and disadvantages in order to find out whether it is worth or not to adopt Cloud Computing.

The main findings of the analysis are that the company main benefits are flexibility and mobility. Flexibility allows the company to scale up or scale down the IT resources needed instantly and by any magnitude, thus adapting to the natural fluctuations of its business. In addition, no big investments have to be made to setup the infrastructure. The mobility comes from the fact that everything (applications, data, communications, etc.) is on the internet and thus, it is available wherever it is needed and can be accessed by any available device regardless of being fixed or mobile. They also identified the regular and frequent backups as an important feature of the cloud computing service. The findings just pointed out are the answer to the first research question. The benefits are within the technological, organizational, and environmental contexts.

The second research question addressed the challenges the company is faced with. The company's concerns were restricted to data protection and liability issues and mainly because the company selected to provide the service is very recent and small. Regarding data

protection, a deeper understanding of the provider operations is needed to be aware of whether this is a concern that needs to be addressed or not (the provider may already be addressing it in a satisfactory manner). Liability is an issue that can be negotiated before the service is contracted. The concerns may affect both the technological and environmental contexts.

Thus, it seems that Foodservice Ltd has more to gain than to loose from the adoption of the cloud computing. First of all because of the nature of industry, there is permanent need for being flexible and mobile. In the organizational context: the scope of business operations and cost efficiency are the main drivers and in the environmental context, competitors' pressure is the highest motivation issue.

The findings of this research may eventually be used in other small and medium size companies, in the same industry and country. However care should be taken, since these findings have been obtained from only one company.

Primary data was collected via a survey and face-to-face interviews and secondary data from public sources. The survey was sent to a Foodservice representative, with whom the face-to-face interviews took place (at the company head offices).

This work provides contributions at two levels, namely: at the company level and at the literature level. In addition to the specific contributions provided to Foodservice Ltd., we also contribute to the literature on Cloud Computing adoption. Although our contribution is small, since we have analyzed only one company, given the lack of research in this domain it may be important.

6.2. Future Research

The lack of research on cloud computing adoption shows that understanding how Cloud Computing influence business and the benefits it can provide are still not explored.

The technologies underlying cloud computing have been available for many years, cloud computing as a computing paradigm, has however only beginning to establish itself. Therefore, the scope for further research is broad. More case studies, both on successful and unsuccessful projects are needed to help to understand the subject and to help design a roadmap for future research.

Other important areas to be analyzed are on their own arise form the concerns that the adoption of cloud computing brings to the companies. This research may focus on any or all of the three contexts referred to in this work. For example, new technologies both at the hardware and software levels to improve security. Regarding the organizational context, one could explore the consequences of adopting the cloud technology on the organizational behavior, on working places (office vs home), work performance (isolation vs tme wasted in commuting), etc. Finally, within the environmental context there may arise several issues, for example sharing information with other companies, sharing data responsibility also with customers, to mention just a few.

Appendix: Questionnaire

1. Name:
2. Position:
3. Industry:
4. What is the size of the enterprise you represent?
    - 1-9
    - 10-50
    - 50-250
    - over 250 Employees
5. Are you a decision maker?
    - Yes
    - No
6. Experience in IT (as user, in years)
7. How did you learn know about Cloud Computing?
    - Advertisement
    - Partner organizations
    - Competitors
    - Friends
8. Experience in Cloud Computing (in years) *email, software, server, platform, etc.*
    - 0-1
    - 1-5
    - 5-10
    - more than 10
    - None
9. 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)

- Security services in the cloud
- Other:

10. 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:
11. Would you use cloud services from different providers?
    - YES
    - NO
    - Other:
12. 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:
13. 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

14. What are your main concerns regarding 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...)

Appendix: Frameworks and methodologies

Article	*Theory*	*Methodology*	*Results*
Examining cloud computing adoption intention, pricing mechanism and deployment model (Hsu et al., 2014).	TOE framework DOI framework	Surveys, Conceptual	Thus, this study provides a theoretical contribution to the IT adoption literature by showing that when applying the well-developed TOE framework to examine mature technologies vs. immature technologies (such as cloud computing), there are note-worthy differences.
Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors(Oliveira et al., 2014)	IPV framework	Factor analysis (FA), logistic regression, Conceptual	The results of analysis showed effect of cost savings on the competitive advantage of cloud computing and its effect on cloud-computing adoption. Also that the manufacturing and services sectors have different motivators of cloud-computing adoption.
The development that leads to the Cloud Computing Business Framework(Chang et al., 2013)	Cloud Computing Business Framework Adaptive Structuration Model	Analysis of different theories, Surveys and quantitative methods	The CCBF defines four key areas, which are (i) Classification; (ii) Organizational Sustainability Modelling; (iii) Service Portability and (iv) Linkage. Organizational Sustainability Modelling is defined in terms of the Organizational data required for the CCBF.
Software as a Service Adoption: Impact on IT Workers and Functions of IT Department (Mbuba & Wang, 2014)	Cloud Computing Business framework (CCBF)	Analysis of different frameworks	empirical examination on the dynamic of changes
Service strategies of small cloud service providers: A case study of a small cloud service provider and its clients in Taiwan Feng (Wang & He, 2014)	Case Study	Surveys	This case study proposes a cloud service strategy matrix

Appendix: Comparison of Georgia with neighbor countries

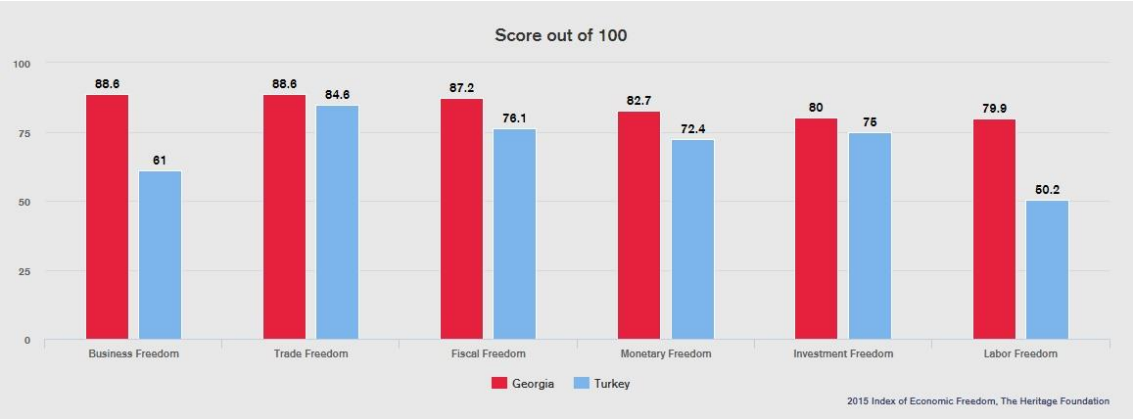


Figure 11 - Economic freedom compared with Turkey

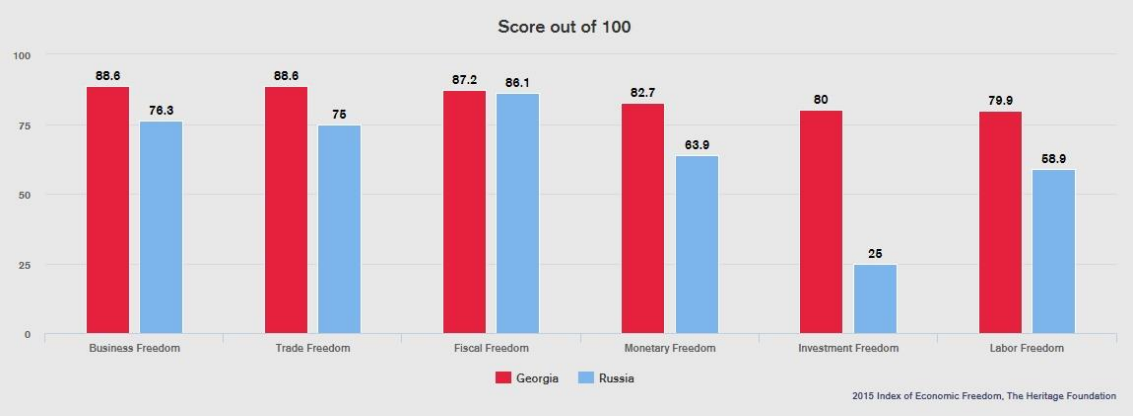


Figure 12 - Economic freedom compared with Russia



Figure 13 - Economic freedom compared with Armenia

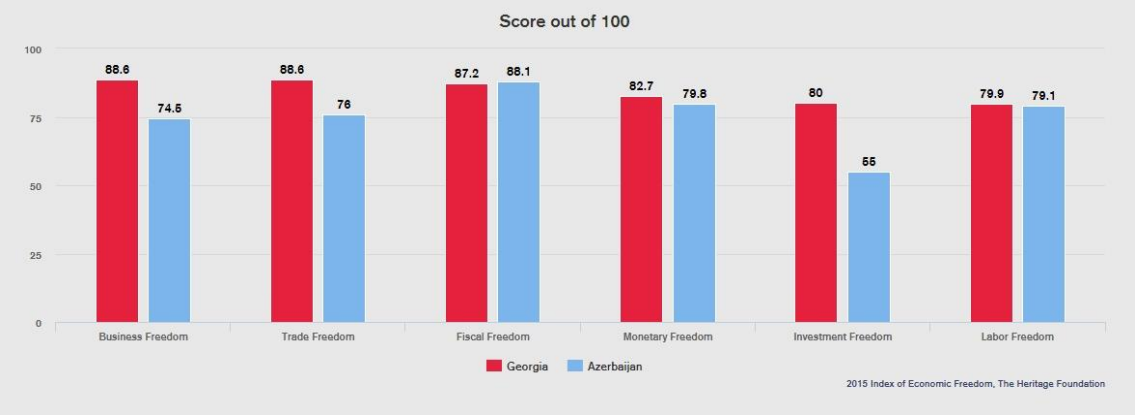


Figure 14 - Economic freedom compared with Azerbaijan

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