TALLINN UNIVERSITY OF TECHNOLOGY

Faculty of Social Sciences

Tallinn Law School

Liliia Oprysk

Differences between IT Outsourcing and providing Cloud Computing services, applicability of Outsourcing regulations to Cloud Computing

Master Thesis

Supervisor: Professor Dr. Katrin Merike Nyman-Metcalf

Tallinn 2016

I hereby declare that I am the sole author
of this Master Thesis and it has
not been presented to any other
university of examination.

Liliia Oprysk
“ ..... “ 2015

The Master Thesis meets the established requirements

Supervisor Professor Dr. Katrin Nyman-Metcalf
“ ..... “ 2015

Accepted for examination “ ..... “ 2016
Board of Examiners of Law Master’s Theses

.....

Table of Contents

List of Abbreviations

API	Application Programming Interface
B2B	Business-to-business
CIA	Confidentiality Integrity Availability
CJEU	European Court of Justice
COE	Council of Europe
CPC	Central Product Classification
DaaS	Data as a Service
ENISA	European Network and Information Security Agency
ETSI	European Telecommunications Standards Institute
EU	European Union
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
IaaS	Infrastructure as a Service
ICT	Information and Communication Technology
ISKE	Estonian Baseline Security System
ISO	International Organization for Standardization
ISP	Internet Service Provider
IT	Information Technology
HaaS	Hardware as a Service
NIST	National Institute of Standards and Technology
PaaS	Platform as a Service
SaaS	Software as a Service
SLA	Service Level Agreement
SME	Small and medium enterprise
TFEU	Treaty on the Functioning of the European Union
WTO	World Trade Organisation
W120	Services Sectoral Classification List
U.S.	United States of America

Introduction

Cloud Computing has been very popular in the recent years among technology service providers, policy makers, and even legal researchers. Service providers stress on the pros of cloud-based solutions advertising their offerings, policy makers acknowledge the importance of the cloud including it into the policy documents and strategies while legal scholars extensively use the cloud as an example of a situation where the law has yet to capture technological development. Although the development of cloud-based technologies changed the way of delivering certain IT services and perception of outsourcer-service provider relations in general, Cloud Computing is not a new technology nor are cloud services provided solely by a limited number of highly specialized providers. Cloud Computing offerings come in different shapes, sizes and capabilities, provided by both traditional IT Outsourcing providers, recently established e-commerce retailers, software development companies, etc.

Because of such a variety of offerings and service providers, comprehensive approach to Cloud Computing requires assessing it in the context of a broader field, it being IT Outsourcing. Cloud Computing should not be examined in isolation taking into regard its complexity, but research should take into consideration other relevant circumstances, such as business context and parties expectations. Thus, the aim of this study is to analyse Cloud Computing from the perspective of a broader and more established concept of IT Outsourcing, assess whether the regulations governing IT Outsourcing can be applied to Cloud Computing by analogy or whether a different approach is necessary.

The reason for choosing IT Outsourcing is Cloud Computing being widely used in the course of IT Outsourcing activities to achieve particular outsourcing goals. An undertaking wishing to outsource internal or external IT functions to an external service provider is faced with a choice between traditional outsourcing services and cloud-based ones, which makes Cloud Computing one of the outsourcing options. Having said that, comparing a cloud-based outsourcing option with a traditional one is capable of giving insights into the different nature of Cloud Computing, and as a result, forming a different approach to applying the relevant regulations.

The study will focus on the business use of Cloud Computing as in this context not only a service has to be in line with the relevant legislation, but also undertaking purchasing the service have to ensure compliance that in certain cases may depend on their usage of a specific cloud-based solution. Furthermore, author's intent is to narrow the research down to an especially troublesome case, where undertaking outsourcing IT functions entrusts them to not a traditional Outsourcing service provider and where service is to be delivered in a public cloud. The main reason behind it is different business relations between outsourcer and service provider than in traditional IT Outsourcing and also the fact that the majority of legal research is covering specifically public cloud. The further justification behind this choice would be provided in the subsequent chapters after elaborating on two concepts and relation between them.

Areas of law to be covered were chosen based on the two criteria, the first being its particular relevance to the Cloud Computing business-to-business (B2B) deals. Secondly, it was done with consideration to the areas with potentially greatest differences in treating traditional IT Outsourcing and Cloud Computing deals. These areas include trade agreements, data protection, competition law, certain aspects of Intellectual Property and contract law. To narrow down the scope of research two example cases will be defined, one for IT Outsourcing and one for Cloud Computing before proceeding to examine those areas, which will then be assessed in the light of example cases. The author has in mind to analyse the situation from the perspective of the customer in B2B Cloud Computing deals, but will eventually highlight some moments that are of relevance to service providers.

The hypothesis of this work is that IT Outsourcing and Cloud Computing concepts relate to each other and are often subject to the same regulations, nevertheless, Cloud Computing may require a different approach when applying these regulations. The first objective is to define IT Outsourcing and Cloud Computing for the purpose of this work and to establish a connection between them, taking into consideration existing legal and, to some extent, technical literature. The second objective is to establish whether a different approach to Cloud Computing is necessary in the context of chosen areas of law and what particular legal issues parties should be aware of.

Consequently, research questions are:

- How Cloud Computing and IT Outsourcing concepts relate to each other?

- Does GATS differentiate between IT Outsourcing and Cloud Computing services?
- Do parties to a Cloud Computing contract get allocated the same roles under data protection legislation as in IT outsourcing one and how may it change with coming reforms?
- Do *ex post* competition regulations effectively promote competition between service providers of traditional IT outsourcing and Cloud Computing services?
- What aspects of IP require an extra attention in the context of Cloud Computing?
- How do contract and Service Level Agreements differ for IT Outsourcing and Cloud Computing deals?

The work is structured according to the research questions. The first chapter starts with the Outsourcing concept and development of IT Outsourcing and proceeds with various definitions of Cloud Computing, and finally highlights discussions on the relation between these two concepts. This chapter also provides working definitions which the author will use while assessing other research questions in the following chapter, along with the reasoning behind using them.

The second chapter assesses remaining research questions and has been divided into five parts: trade regulation (GATS), data protection, competition law, Intellectual Property (IP) and contract law. Abovementioned example cases for IT Outsourcing and Cloud Computing will be defined at the beginning of this chapter for the research to focus on particular real-life situations.

Finally, the third chapter looks into Cloud Computing in the context of Digital Single Market strategy, summarizes EU efforts to promote adoption of Cloud Computing and harmonize the market by standardizing the offerings.

To reach the defined objectives, the author will use legal research method, where the primary (treaties and conventions, EU legal acts) and secondary (relevant legal literature and articles) sources will be combined. On the other hand, sources will also include other literature, such as articles and standards in the IT field and the author will use comparative method to examine different perspectives on the concept of IT Outsourcing and Cloud Computing. The qualitative method will be used to assess differences in treatment of Cloud Computing and IT Outsourcing by certain regulations. Service terms of particular offerings will be used to back up certain points brought forward by the author.

1. IT Outsourcing and Cloud Computing concepts

1.1. Defining Outsourcing

Outsourcing is a widely-used term in the economic and political context that in general stands for a business practice of contracting out some of the activities to the third parties. There have been numerous researches done on Outsourcing, defining the concept and setting criteria for the assessment of Outsourcing effectiveness. Some definitions are rather narrow, defining Outsourcing as a concept of hiring outside professional services to meet the in-house needs of an organization or an agency,[1] while others are wider, as for example "practice of one company hiring another company to perform tasks that used to be in-house"[2] or that Outsourcing constitutes "a transfer of internal activities not being part of the core business of the outsourcer to a third provider, without being linked by any kind of subordination"[3].

While the latter definition is widely accepted, this author would like to use a slight modification of it when referring to Outsourcing in this paper. First of all, it is no longer accurate to link Outsourcing solely to the non-core activities, the scale of the industry and complexity of Outsourcing deals suggest that core business activities can be, and indeed are successfully transferred to the third parties if it is feasible from a business perspective.[4] Moreover, current paper will assess Outsourcing from a legal perspective, consequently the importance of activity which is to be outsourced is of little relevance. Secondly, the author would prefer not to limit Outsourcing as a concept to the transfer of internal activities, as they may have been carried out by the third parties previously or were non-existent at all and enabled by the recent development of technology. Thus, the author will use an adaptation of the abovementioned definition when referring to Outsourcing, namely a business practice of transferring business activities of the outsourcer to a third provider without being linked by any kind of subordination.

---

[1] Gupta *et al.* Outsourcing the IS function: is it necessary for your organization? Information Systems Management 1992, p. 45.
[2] Bednarzik *et al.* Restructuring information technology: is offshoring a concern? 128 Monthly Lab. Rev. 11 2005, p. 12.
[3] Jardin *et al* Outsourcing: some legal aspects. www.legal500.com/assets/images/stories/firmdevs/nobl11898/outsourcing_-_some_legal_aspects_september_2008.pdf (26 September 2015), p. 1
[4] Kavaleff, A. Successful Outsourcing through Proactive Contracting - Strategy, Risk Assessment and Implementation. Scandinavian Studies in Law 2006, 49, p. 225.

Much has been written on the topic of Outsourcing as a business practice, covering strategic dimension and achieving the best outcome. There are at least few reasons that may induce businesses to engage into Outsourcing and consequently contract out some of their business activities to the third parties, which are capable of performing them more efficiently, professionally or simply less costly. Costs associated with a certain activity remains the main incentive to outsource or at least one that is most widely cited by scholars. Possibility of carrying out a certain task at a lower cost is indeed attractive to any business if seen apart from the quality and feasibility perspective. It may further contribute to the efficiency, as, if Outsourcing deals implemented successfully, it would let business focus on the tasks of its primary expertise, which may as well contribute to the rise of an overall productivity.

All these pros develop into additional value, which is innovation that is enabled by the extra costs saved by Outsourcing and can be invested into research and development. In addition, the existence of Outsourcing market itself contributes to the innovation, as it straightens competition between Outsourcing service providers and urges them to offer innovative, efficient and affordable solutions. Customers of businesses that outsource may have their share in those benefits, decreasing costs associated with the production of a certain product or service can likely result in the prices of the end-product going down. It would not only make products more affordable to consumers but could possibly even expand relevant consumer market for the particular product.

Outsourcing industry creates additional possibilities for developing countries since businesses often prefer Offshoring as a type of Outsourcing where activities are transferred abroad in order to take an advantage of lower labour and facility costs.[5] Those countries benefit not only income-wise but also knowledge-wise, as intellectual property and know-hows are often shared between outsourcer and the third party in the course of business. Although service provider may not be allowed to exploit IP rights directly, it certainly contributes to the forming of skilled workers groups. Last but not least - human resource is an important factor in any business strategy, which sometimes cannot be found within the country's borders. Investment money may be there, but a shortage of skilled personnel to handle it may become an obstacle to achieving success, which may be eliminated by Outsourcing.

As with any business practice, there are particular risks associated with Outsourcing. These

[5] Bednarzik *et al.* (2005), *supra* nota 2, p 11.

include, but are not limited to the loss of control over the activity that may affect strategic and operational goals, cultural and language difficulties in the case of Offshoring that may lead to problems in managing relations between outsourcer and provider and also possible hidden costs, often remaining non-obvious. Barthélemy *et al.* (2001) define four types of such hidden costs,[6] which also help to understand the complexity of each Outsourcing deal. First of these costs is vendor search and contract cost, as finding a perfect match for one's need can be a long process requiring considerable amount of resources, and so do contract negotiations. Second hidden aspect is an actual transition to the vendor, which is often missed when calculating a cost of a deal. There are always costs associated with a transfer, be it for shipping the hardware or for paying own employees during ongoing knowledge transfer, or any other types of losses suffered because of systems' downtime during the transition. Thirdly, resources are necessary to manage the effort along the road, the more critical outsourced activity is for business, the bigger spending on keeping it on track is required. Finally, a company should think about the transition after the end of Outsourcing agreement as there is always a risk that one would need to move operation back in-house, and sufficient level of expertise will have to be maintained.

The impact of Outsourcing on countries' economies differ, depending on whether it is the one where Outsourcing service providers reside or the one where businesses outsource. Economic benefits of Outsourcing for different countries have been studied and, interestingly enough, it was found that United States gained $1.14 for every dollar their companies spent on Outsourcing to India while companies in Germany were losing €0.20 for every euro spent on Outsourcing.[7] Scholars suggest that it depends on the flexibility of each country, language, culture, costs associated with coordinating projects and Offshoring destination itself.

With the rise of computerization and especially after the emergence of Web 2.0 businesses became more dependent on information technologies. Not only whole departments would switch from paperwork to the computer-empowered solutions, but also customers would expect online services and instant communication with suppliers. IT became not only a necessity but also created possibilities for new types of businesses, while for existing it offered greater efficiency, alternative ways of

[6] Barthélemy, J. The Hidden Costs of IT Outsourcing. MIT Sloan Management Review, 2001, 42(3), p. 61.
[7] Schultz, C. W., To Offshore or not to Offshore: Which Nations Will Win a Disproportionate Share of the Economic Value Generated from the Globalization of White-collar Jobs? Houston Journal of International Law 2006-2007, 29 (1), p. 241.

reaching the consumers, etc. It became an essential part of almost any business, and soon entities were faced with a decision whether to maintain IT systems by themselves or to outsource it completely or in part to the third parties. As discussed above, it was a choice driven by cost and time efficiency considerations, an attempt of innovation, lack of in-house expertise and so on.

A new industry emerged with IT Outsourcing companies offering their services to any kind of businesses, ranging from simple infrastructure maintenance or application development to the front- and back-offices. With the time, IT Outsourcing became so widely adopted that Outsourcing became first of all associated with IT. Next, the author would like to stress upon few key moments when it comes to IT Outsourcing development and proceed further to examine Cloud Computing and its place within IT Outsourcing.

1.1.1. Development of IT Outsourcing

As with Outsourcing itself, there is no single definition of IT Outsourcing. At the early beginning of IT Outsourcing some defined it as "a significant contribution by external vendors in the physical and/or human resources associated with the entire or specific components of the IT infrastructure in the user organization"[8], highlighting infrastructure component. Lately, IT Outsourcing has been defined in a more general way, as for example being a transfer of an IT related activity of a company, in whole or in part, to a third person.[9] Latter definition recognises other aspects of IT delivery besides infrastructure and also the complexity of deals and relationships between service providers and outsourcers. Interestingly, ISO Standard for Information technology provides a definition of Outsourcing without linking it to the IT, as making "an arrangement where an external organisation performs part of an organisation's function or process"[10].

Outsourcing has long been seen as a practice of contracting out non-critical business activities because it was widely believed that company's competence determine its competitiveness. Subsequently, by letting others carry out these actions company would lose in its distinctiveness. As a rule of thumb, business should focus on what they are good at and what makes it different from

[8] Loh *et al.* Diffusion of Information Technology Outsourcing Influence Sources and the Kodak Effect, Information Systems Research 1992, 3(4), p. 336.
[9] Jardin *et al.* (2008), *supra* nota 3, p 1.
[10] ISO/IEC. 27000:2014 Information technology - Security techniques - Information security management systems - Overview and vocabulary. International Organization for Standardization, Geneva, Switzerland. p. 7.

competitors and let others handle remaining parts.[11] For a long time Information Technology remained a resource that contributed to product or service development but was not considered to be business-critical one. Computing power and latest technology solutions were still quite expensive with only large corporations that could afford them, but later, once solutions became more affordable, companies were more willing to bring infrastructure in-house.

At this point IT became a general-purpose technology,[12] some scholars even draw parallels with electricity supplies in 19th century.[13] Smaller companies could not afford building own power supplies and were forced to obtain power from larger providers, which, however, turned into benefits for them – they became more competitive than large companies that were putting too much effort and resources into building own infrastructure. Nevertheless, IT soon transformed from being merely an asset companies would own into a service they would purchase.

Although first Outsourcing deals within IT industry occurred much earlier, it was not until 1989 they were significant, both from the impact they had on business and from the amount of costs involved. Scholars suggest that Eastman Kodak's Outsourcing contract with IBM is where IT Outsourcing really took off, with Kodak handling over the majority of its IT operations.[14] Interestingly enough, Kodak's executives were criticized for their decision as it was believed such a move demonstrated company's weakness of being unable to handle those processes by itself. However, deal proved to be successful and, as CEO of Everest Software said, "What Kodak did for outsourcing is akin to what IBM did for PCs"[15]. In the early 1990s IT Outsourcing became global, and Offshoring emerged – IT functions were outsourced not only to the vendors within the same jurisdiction but also abroad. At this time, most of the contracts were single-vendor total Outsourcing contracts.[16]

ITO developed from being conventional and primarily focused on cost reduction and short-term transfer of simple operations into being strategic, focused on the business processes. The shift

[11] Allweyer *et al.* IT outsourcing: between starvation diet and nouvelle cuisine. Deutsche Bank Research, 2004, 43, p.6.
[12] Carr, N. G. The End of Corporate Computing. MIT Sloan Management Review, 2005, 46(3), p. 68.
[13] Gonzales *et al.* Outsourcing: Past, present and Future. IT and Public Policy, 2014. courses.cs.washington.edu/courses/csep590/04au/clearedprojects/Dorwin.pdf (26 September 2015). p. 4.
[14] Weinert et al. The Evolution of IT Outsourcing: From its Origins to Current and Future Trends. University of Wuppertal Working paper no. 202, 2005. p. 9.
[15] Field, T. Kodak's 1989 outsourcing deal shifted the way CIOs looked at their work. And the changes aren't over yet. CIO 1999, 13(1), p.74.
[16] Amant, K. St. IT Outsourcing: Concepts, Methodologies, Tools, and Applications. New York, Business Science Reference 2009, p. 1704.

happened because of the change in the perception of IT – rather than being a cost burden and generating no competitive advantage it later became critical and required adopting a strategy to benefit from it. IT Outsourcing made it possible to substitute missing internal capabilities and skills with vendor's competencies, take advantage of new technologies and gain access to knowledge and innovation.

Already in 2003 amount of contracted out IT services in Germany exceeded 10 billion of euro, with Germany and the United Kingdom together accounting for approximately half of the EU market at the time.[17] IT Outsourcing global revenues were expected to exceed 200 billion dollars per year by the end of 2005.[18] In 2011 figures showed 246.6 billion dollars revenue, where those providing cloud-based services delivered highest growth rates.[19]

High quantity of Outsourcing deals and strong competition between service providers urged IT Outsourcing companies to enhance services they offered to maintain competitiveness. Three technologies which developed in the course of IT Outsourcing business lately formed a basis for Cloud Computing services. These are Virtualization[20], Grid Computing[21] and Web services[22]. While the key benefit of virtualization was a rapid deployment of systems and effective resource utilization, Grid computing offered pools out of hardware components and aggregated capacity to be allocated for different purposes, Web services standardized interfaces between the applications to make integration easier.[23]

As IT Outsourcing companies were growing bigger and getting more customers, there was a constant need to work on the improvements of technology, e.g. how to make infrastructure effectively serve multiple customers (processing power, storage capacities etc.), how to eliminate system

[17] Allweyer *et al.* (2004), *supra* nota 11, p. 6.
[18] Willcocks *et al.* Information Technology Sourcing: Fifteen Years of Learning. Working Paper. Department of Information Systems, London School of Economics and Political Science 2006. www.lse.ac.uk/management/documents/research/is-working-papers/ISIG-WP-144.PDF (26 September 2015). p. 1.
[19] Pettey, C. Gartner Says Worldwide IT Outsourcing Market Grew 7.8 Percent in 2011. www.gartner.com/newsroom/id/2021215 (26 September 2015).
[20] Virtualization is technology to create virtual version of computing resources for different purposes, e.g. to divide them between different instances. One commonly used example is virtualization of hardware, where a virtual server can be deployed on top of the already installed operating system, circumventing hardware architecture constraints.
[21] Grid Computing is an architectural solution where computing resources are distributed between different locations, but are utilized for the same goal, with components usually carrying out different functions.
[22] In this context Web services is a tool to standardize application interfaces to make the system accessible from a wide range of devices.
[23] Carr (2005), *supra* nota 12, p 71.

downtime during an upgrade or reconfiguration in order to meet Service Level Agreements (SLA) requirements, how to offer customers more control or at least provide instant on-demand overview of their IT resources. As one of the latest trends Cloud Computing developed, being not a new technology itself, but rather a new way of delivering services incorporating recent developments.

1.2. Cloud Computing as a new way of delivering services

"The interesting thing about cloud computing: it is either going to be or already is the most important computing architecture in the world, because [...] we've redefined cloud computing to include everything that we currently do. I can't think of anything that is not cloud computing. […] The computer industry is the only industry that is more fashion driven than women's fashion" [24].

Statement by Larry Ellison, CEO of Oracle dated 2008 is widely cited in the context of Cloud Computing and illustrates well the difficulties of defining the concept as well as differences in its perception, especially in the early years of Cloud Computing adoption. Interestingly enough, only a few years later in 2011 Oracle marketed the newly developed product as "the first in Oracle's portfolio numbered "12c" where the "c" stands for Oracle's significant investments in delivering cloud-ready products"[25] and already in 2012 offered Oracle Cloud as a service. Initial scepticism about Cloud Computing as a concept was overridden by the success of marketing efforts and growing demand for flexible and scalable IT solutions to be delivered as a service.

1.2.1. Cloud Computing definitions

Cloud Computing as a concept appeared some ten years ago and has been on every IT executive mind or even agenda ever since, still steadily growing in popularity. Although there is no common definition of Cloud Computing, studies show that the term itself was first introduced by technology companies in 2006 in the marketing context. It described a new concept of services that offered scalability of resources and accessibility of software over the Internet. Amazon Elastic Computer cloud (EC2) commercial web service is often referred to as a first widely accessible Cloud Computing infrastructure service, explicitly using Cloud Computing terminology. Same year, 2006,

[24] Fowler *et al.* The Internet Industry Is on a Cloud - Whatever That May Mean. The Wall Street Journal 2009. www.wsj.com/articles/SB123802623665542725 (26 September 2015).
[25] Oracle Unveils Oracle Enterprise Manager 12c, 2011. www.oracle.com/us/corporate/press/512064 (26 September 2015).

Cloud Computing term was first used in a patent application lodged by Microsoft, followed by a brief explanation of what Cloud actually is: "A 'cloud' refers to a collection of data and resources (e.g., hardware, data and/or software) provided and maintained by an off-site or off-premise party (e.g., third party), wherein the collection of data and resources can be accessed by an identified user via a network"[26].

Numerous studies have been conducted on the topic of Cloud Computing since that time, one of them being a comparison of various Cloud Computing definitions. It was carried out in 2009 and results showed that key elements used to describe Cloud Computing were service, hardware, software, scalability, and network.[27] Some of the most widespread definitions of Cloud Computing will be provided below, grouped accordingly to the similarities in them.

One of the most widely cited definitions is one by United States National Institute of Standards and Technology (NIST), that 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"[28]. Similarly, Leimeister *et al.* (2010) consider Cloud Computing as "an IT deployment model, based on virtualization, where resources, in terms of infrastructure, applications and data are deployed via the internet as a distributed service by one or several service providers....services are scalable on demand and can be priced on a pay-per-use basis"[29]. Both of the definitions describe Cloud Computing as a tool for providing resources that meet pre-defined requirements, those being scalability, on-demand accessibility, and rapid provisioning.

Marston *et al.* (2011) provide similar definition, focusing on the business aspect of Cloud Computing and key benefits for business, while stressing upon it being a service: "It is an information technology service model where computing services (both hardware and software) are delivered on-demand to customers over a network in a self-service fashion, independent of device and location. The resources required to provide the requisite quality-of-service levels are shared, dynamically

[26] Gounares *et al.* (2006) Data normalization. United States patent US2008082480 A1.
[27] Leimeister *et al.* The Business Perspective of Cloud Computing: Actors, Roles and Value Networks. ECIS 2010 Proceedings. www.home.in.tum.de/~riedlc/res/LeimeisterEtAl2010-preprint.pdf (26 September 2015). p.4.
[28] Mell *et al.* The NIST Definition of Cloud Computing. National Institute of Standards and Technology, Information Technology Laboratory, 2011. csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf (26 September 2015). p. 6.
[29] Leimeister *et al.* (2010) *supra* nota 27, p.4.

scalable, rapidly provisioned, virtualized and released with minimal service provider interaction. Users pay for the service as an operating expense without incurring any significant initial capital expenditure, with the cloud services employing a metering system that divides the computing resource in appropriate blocks"[30].

Although Armbrust *et al.* (2009) do not provide definition of Cloud Computing, they define it through the components: "Cloud Computing refers to both the applications delivered as services over the Internet and the hardware and systems software in the data centers that provide those services… When a Cloud is made available in a pay-as-you-go manner to the public, we call it a Public Cloud; the service being sold is Utility Computing. Cloud Computing is the sum of SaaS and Utility Computing, but does not include Private Clouds"[31]. Here an important distinction is made, separating delivery of hardware and supporting services from applications delivered as a services.

Another definition, focusing on the service component is one provided by Edlund, where Cloud Computing is a comprehensive IT-based ecosystem that creates a flow of services between those owning machines and networks (providers of infrastructure) and those creating solutions (developers of cloud computing services) for end-users (of cloud computing services).[32] Despite the definition itself being a good illustration of business relations between stakeholders which in turn provides value for the end-user, the author would like to note that it may not be feasible to define providers of infrastructure as owners of hardware as it is not always the case. Wang *et al.* (2008) define Cloud Computing as "a set of network enabled services, providing scalable, QoS guaranteed, normally personalized, inexpensive computing platforms on demand, which could be accessed in a simple and pervasive way"[33].

---

[30] Martson *et al.* Cloud computing - The business perspective". Decision Support Systems, 2011, 51, p. 177.
[31] Armbrust *et al.* Above the Clouds: A Berkeley View of Cloud Computing. Technical report, EECS Department, University of California at Berkeley, 2009. www.eecs.berkeley.edu/Pubs/TechRpts/2009/EECS-2009-28.html (26 September 2015). p. 6.
[32] "Molnet betyder olika saker för olika användare och kan sammanfattas som ett komplett IT-baserat ekosystem som skapar ett flöde av tjänster mellan de som äger maskinerna och nätverket (leverantörerna av infrastrukturen), till de som skapar lösningar (utvecklarna av molntjänster) för slutanvändarna (av molntjänster)." (Translation by the author). Edlund, Å. Cloud Computing. Challenges and Opportunities for Swedish Entrepreneurs. Näringspolitiskt forum Rapport #5. Entreprenörskapsforum, 2012. entreprenorskapsforum.se/wp-content/uploads/2012/11/N%C3%A4Po_Cloud_Webb.pdf (26 September 2015). p. 7.
[33] Wang *et al.* Scientific Cloud Computing: Early Definition and Experience. 10th IEEE International Conference on HPCC, 2008, p. 3.

Some scholars refrain from defining Cloud Computing as a separate concept, but see it as a sum of early developed ones. Youseff *et al.* (2008) state that term Cloud Computing "is based on a collection of many old and few new concepts in several research fields like Service-Oriented Architectures (SOA), distributed and grid computing as well as virtualization. […] New computing paradigm that allows users to temporary utilize computing infrastructure over the network, supplied as a service by the cloud-provider at possibly one or more levels of abstraction" [34]. A similar definition can be found in KMPG's report on Cloud Computing: "The Cloud is used to cohesively identify a series of technological innovations / advancements in the fields of IT and telecommunications. These advancements have together to complement each other thereby leading to the creation of an offering called 'the Cloud. […] Services of the Cloud, are made available through virtualization and provided on a usage-based pricing model […] can be quickly provisioned and easily managed, by the user, without any major inputs from service providers of the Cloud"[35].

Hence, Cloud Computing definitions differ, from describing a business model to identifying a particular type of service, consequently leaving the room for further discussions. Because of such a broad variety of interpretations, various services can be understood under Cloud Computing. As correctly noted in the last two definitions, the concept of Cloud Computing is not a new technology itself but consolidates existing technologies and business practices into a new paradigm. Virtual world and hosted or co-located environment are seen as major enablers of Cloud Computing,[36] as well as large data centers and development of virtualization technologies.[37] Wide adoption of Cloud Computing would not be possible without high computer penetration into the business communication, high data transfer rates and availability, high reliability of servers and networked storage.[38] An interesting point is made by Armbrust *et al.* (2009), including into the list of key enablers of Cloud Computing low-cost locations of large-scale data centers.[39]

---

[34] Youseff *et al.* Toward a Unified Ontology of Cloud Computing. Grid Computing Environments Workshop, 2008, p. 1.
[35] KPMG's The Cloud: Changing the Business Ecosystem, 2011. www.kpmg.com/IN/en/IssuesAndInsights/ThoughtLeadership/The_Cloud_Changing_the_Business_Ecosystem.pdf (26 September 2015). p.18.
[36] Ibid, p. 15.
[37] The top 5 truths behind what the cloud is not. White paper. Citrix Cloud Solutions, 2012. www.citrix.com/content/dam/citrix/en_us/documents/products-solutions/the-top-5-truths-behind-what-the-cloud-is-not.pdf (26 September 2015). p. 3.
[38] Carr *et al.* (2005), *supra* nota 12, p. 70.
[39] Armbrust *et al.* (2009), *supra* nota 31, p 7.

Leimeister *et al.* (2010) access prerequisites of Cloud Computing from a different perspective, connecting it with the challenges and constrains between Outsourcing providers and their customers, with Cloud Computing being a solution for providers' cost-effectiveness, efficiency and flexibility considerations: "Cloud computing aims to provide the technical basis to meet customer's flexibility demands on a business level. […] Cloud Computing has been established as the most recent and most flexible delivery model of supplying information technology"[40].

1.2.2. Cloud Computing characteristics

Cloud Computing is used to describe a variety of services provided online, starting from accessing the particular application through a web-browser, transfer of data to the remote storage to using web-interfaces to rent server power in the remote data center. There are some common characteristics of these services – they are all provided online, using a web interface (although it can also be an application installed on the host, be it laptop, tablet or smartphone) with the application itself residing on remote infrastructure.

There is indeed nothing new about such services so one could ask how it differs from traditional service models. NIST definition of Cloud Computing also includes five essential characteristics that are more or less accepted by the wider community.[41] The author will list them in the ascending order, from less important to the ones that really differentiate Cloud Computing from other services. First two characteristics are rapid elasticity meaning a possibility of scaling the resources at any time at high speed and resource pooling – dynamical assignment of resources from provider's pool based on the need. Both of these characteristics are enabled by usage of virtualization techniques. Although Cloud Computing is heavily relying on virtualization, it is not server virtualization itself, but a new way to provision, manage and orchestrate infrastructure resources across a data center.[42]

The third feature is broad network access meaning accessibility of resources from different types of clients (e.g. smartphones, laptops, workstations). So far listed characteristics have not been distinctive enough to differentiate Cloud Computing from other services built on virtualization and

[40] Leimeister *et al.* (2010), *supra* nota 29, p. 7.
[41] Mell *et al.* (2011), *supra* nota 28, p. 6.
[42] The top 5 truths behind what the cloud is not (2012), *supra* nota 37, p. 3.

accessible through a wide range of clients. Last two characteristics are, to the author's mind, what makes Cloud Computing a comprehensive concept, these being measurability of service and on-demand self-service. The architecture of Cloud computing anticipates that leverage of resources can be monitored and reported, making measurement and billing transparent. Services are to be provided on-demand by automatically allocating resources without interaction with different service providers.

Armbrust *et al.* (2009) provide also features of Cloud Computing from business perspective: infinite availability of resources that diminishes the need to plan far ahead resource provisioning for Cloud Computing clients; smaller cost for initial setup and possibility to scale that new enterprises benefit from; pay-per-use billing model on a short-term basis which reduces costs and avoids overprovisioning of resources.[43]

As there is no conformity in views on the term of Cloud Computing, there is no agreed structure of the model. However, three-layer model, provided in the abovementioned NIST definition of Cloud Computing is most widely accepted. Three layers of Cloud Computing model are Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). IaaS provides services on the level of hardware that could include servers, storage, routers, etc., with service provider owning (or renting) infrastructure and maintaining the equipment while the customer is paying for the usage. PaaS provides tools for managing the hardware, including operating systems, networking, storage, middleware and application development environment. Finally, SaaS allows a client to run applications on cloud infrastructure without managing underlying infrastructure and platform.[44]

However, not all the scholars agree with this layering model, Arnbrust *et al.* (2009), for example, divide Cloud Computing into Software as a Service and Utility Computing that incorporates all underlying infrastructure necessary for enabling SaaS, including hardware and platforms.[45] Wang *et al.* (2008) divide Cloud Computing into Hardware as a Service (physical infrastructure), Software as a Service (application accessible through the Internet) and Data as a Service (DaaS, remote storage of data), that together form Platform as a Service that is offered as Cloud Computing Services.[46]

[43] Armbrust *et al*. (2009), *supra* nota 31, p 3.
[44] Mell *et al., supra* nota 28, pp 2-3.
[45] Armbrust *et al*. (2009), *supra* nota 31, p 3.
[46] Wang *et al.* (2008), *supra* nota 33, p 3.

Others define more layers, as for example *Youseff at al* (2008) differentiate between application (corresponds to SaaS), software environment (corresponds to PaaS), software infrastructure (corresponds to IaaS, DaaS and Communication as a Service), software kernel, and hardware/firmware (HaaS) [47].

As to the types of "Clouds" where services reside, or their deployment models, they are usually classified into four types: private, public, community and hybrid, according to the NIST definition of Cloud Computing.[48] Public clouds are available for any client, and usually client does not have control over the location of the infrastructure itself (but there are still exceptions, for example, Amazon's EC2 let you choose a region). Private cloud is built for a specific client and is accessible only by the particular client, offering extra control and security. Community clouds can be accessed by members of certain community – different state institutions, a group of companies etc. Finally, hybrid cloud constitutes a mix of previous ones in order to increase the flexibility of used resources, taking into account sensibility of data.

The French General Secretariat of the Prudential Supervisory Authority defines community cloud as external private cloud and private as internal private cloud,[49] while Gupta *et al.* (2014) add to the list virtual private cloud as one allocated within a public cloud environment, but isolated on a certain level, usually on a network level.[50] Luoma (2013) shortens the list and defines three models: private, public and hybrid.[51] Arnbrust *et al.* (2009) do not support the idea of differentiation based on accessibility of services and actually include only public cloud into Cloud Computing, excluding private cloud as being an internal data center.[52]

[47] Youseff *et al.* (2008), *supra* nota 34, p 3.
[48] Martson *et al.* (2011), *supra* nota 30, p 180.
[49] The risks associated with cloud computing. Analyses et Syntheses. Autorité de contrôle prudential. acpr.banque-france.fr/fileadmin/user_upload/acp/publications/analyses-syntheses/201307-The-risks-associated-with-cloud-computing.pdf (26 September 2015). p. 3.
[50] Gupta *et al.* Cloud Computing: Comparison with Previous Technique and Research Challenges. International Journal of Computer Applications, 2014, 85(8), p. 45.
[51] Luoma E. Examining Business Models of Software-as-a-Service Companies. Jyväskylä Studies in Computing, 2013. jyx.jyu.fi/dspace/bitstream/handle/123456789/42663/978-951-39-5562-5_vaitos19122013.pdf (26 September 2015). p. 16.
[52] Armbrust *et al.* (2009), *supra* nota 31, p 3.

1.3. Cloud Computing in the light of IT Outsourcing

There are quite many researches on Cloud Computing already, however most of them focus on its technical aspects, and only few of them examine the concept in the light of IT Outsourcing. There is also a fundamental difference between the existing studies on Cloud Computing and those on the topic of IT Outsourcing. While former are technology-centered and tend to focus on different implementation scenarios for achieving high availability, latter studies are more human-centered as they mainly explore the topic of managing business relations.[53]

Different opinions exist on how IT Outsourcing and Cloud Computing relate to each other. Some scholars see Cloud Computing as an evolution of IT Outsourcing because it gives an organization an opportunity to externalize purchase of IT-resources and capabilities and receive them from a third party as a service.[54] Other think that Cloud Computing is fundamentally different from Outsourcing, because it does not simply move existing function out of the department, enterprise, or geographic jurisdiction, but makes applications originate from the cloud.[55] This author cannot agree with such statement to the full extent because of a few reasons. Firstly, as popular quote states, "there is no cloud, just someone else's computer". Taking advantage of Cloud Computing services to provide value to company's customers ultimately embodies usage of some remote infrastructure, substituting one located in-house and is a legitimate purpose of IT Outsourcing. Secondly, Outsourcing is not always about a transfer of a function that was previously carried out in-house or by rather different means, it can also be that function wasn't present there at all. Although Cloud Computing opens new possibilities of carrying them out efficiently, it nevertheless does not differ from IT Outsourcing in that sense. Thirdly, using Cloud Computing services does not necessary mean transfer of a function to the provider, which will be further explored in the following chapter.

1.3.1. Relation between IT Outsourcing and Cloud Computing

Apart from differentiating the concepts few studies actually establish a relation between them. One of the views is that Cloud Computing is as a tool for enabling IT Outsourcing, characterized by

[53] Yigitbasioglu *et al.* Cloud Computing: How does it differ from IT outsourcing and what are the implications for practice and research? The International Journal of Digital Accounting Research, 2013, 13, p. 100.
[54] Ibid, p. 102.
[55] Katzan, H. Jr., Cloud Software Service: Concepts, Technology, Economics. Service Science, 2009, 1(4), p. 258.

delivering IT resources as services over the Internet while charging users on a pay-per-use basis or alternatively that Cloud Computing is an outsourcing decision to purchase IT resources from a third party as a service.[56] The similar view is that Cloud Computing is defined first of all through scalability of the resources, which makes Cloud Computing a tool to use for Outsourcing of critical internal infrastructure.[57] Here the author would like to note that, despite the fact that underlying IT infrastructure where Cloud Computing services reside is remote, and customers do not own or rent it, they still retain control of the service itself. Quantity, configuration, additional features, everything is still up for a client to decide on, Cloud Computing services are not tailor-made solutions which IT Outsourcing usually delivers. As Kuan Hon nicely summarized, Cloud Computing is actually renting do-it-yourself resources based on your choice but within the constraints of the, usually standardised, service offered.[58] Cloud Computing, nevertheless, delivers a high scalability by creating possibility to add resources instantly in a matter of seconds or minutes, which was not possible with traditional IT Outsourcing models as mentioned above.

In terms of value which company using Cloud Computing services creates for its own clients, its chain transformed drastically, which is where Leimester *et al.* (2008) see the difference between IT Outsourcing and Cloud Computing. With the emergence of such new services and actors (i.e. Cloud Computing service providers) chain transformed into an actual "value network" with the aim to provide the technical basis to meet customer's flexibility demands on a business level.[59] Another difference highlighted is that Cloud Computing is an asset-free provision of technological capacities, meaning that, unlike IT Outsourcing customer does not own or rent any assets, but receives a service instead. It is essential to bear in mind that in such case we are comparing IT Outsourcing to the public cloud and exclude other possible types (private, for example), where Cloud Computing solutions can be built for a particular customer who will acquire the ownership of infrastructure or rent it.

From the business perspective, Cloud Computing creates a challenge for IT Outsourcing providers because they have to provide traditional IT services and simultaneously meet growing demand for Cloud Computing services. Thus, besides large Cloud Computing providers like Amazon

[56] Yigitbasioglu *et al.* (2013), *supra* nota 53, p. 102.
[57] Martson *et al.* (2011), *supra* nota 30, p 177.
[58] Hon, K. The 12 Cs of Cloud Computing: A Culinary Confection. www.scl.org/site.aspx?i=ed26082 (26 September 2015).
[59] Leimeister *et al.* (2010) *supra* nota 29, p.7.

and Google, who have not previously been engaged in Outsourcing, services are also provided by traditional IT Outsourcing providers. The study by the French General Secretariat of the Prudential Supervisory Authority indicates that a large majority of companies consider Cloud Computing to be one particular method of IT Outsourcing.[60]

According to the survey made by PwC in 2011, 41% of IT Outsourcing customers already used an external private cloud, 31% used internal private cloud and 22% used the public cloud.[61] Statistics shows that customers engaged in Outsourcing tend to build Cloud for themselves (private cloud), either by themselves (internal) or with the help of external provider (external) rather than using public cloud. It also means that they are more willing to turn to traditional IT Outsourcing providers to obtain the service. New types of services emerged in IT Outsourcing field because of Cloud Computing, such as analysis of existing IT services and estimating the efficiency and possibility to move them to the Cloud. Survey showed that respondents who were not using Outsourcing services previously were also developing Cloud Computing strategies, which means that Cloud Computing helps traditional IT Outsourcing companies to get new customers by following the trend and offering Cloud Computing services.[62]

Unlike IT Outsourcing contracts that typically are concluded for a rather long terms (5-10 years), Cloud Computing contracts are short, especially those in regard to public cloud, where time can vary starting from a couple of days or even hours. Also, unless company builds own internal or external cloud, it uses generic solutions offered by Cloud Computing provider. These are standard configurations that sometimes can be adjusted or chosen in between, but otherwise only scalable in quantity. It is not a tailored solution for particular business as in case with IT Outsourcing, although one can obtain it by building a private cloud. Service Level Agreements are common in IT Outsourcing contracts, however, they are weak in Cloud Computing ones. Taking into consideration multiple layers of virtualization necessary for the cloud to operate, service providers have difficulties in calculating possible SLA obligations and those may be not that detailed or easy enforceable.

[60] The top 5 truths behind what the cloud is not (2012), *supra* nota 37, p. 7.
[61] The future of IT outsourcing and cloud computing A PwC study, 2011. www.pwcaccelerator.com/pwcsaccelerator/docs/future-it-outsourcing-cloud-computing.pdf (26 September 2015). p. 29.
[62] Ibid, p. 28.

A company using Cloud Computing service, especially in a public cloud, loses control over certain aspects of service provision, in contrast to IT Outsourcing contracts, where basically any detail can be negotiated and included in the contract. First of all it influences sub-contracting – while there is usually an agreement between parties to the Outsourcing contract whether sub-contracting is permitted and on what conditions, for public cloud the option is no existent – data centre, hardware, particular operations can all be provided by third parties, while service provider of the Cloud Computing service itself remains the only party bound by the contract.

Data processing is a widely discussed topic in the context of Cloud Computing and there are different issues to be tackled, as a question of control over data and it will be further examined in the next chapter. Unlike typical Outsourcing agreements where service provider is actively involved in all the processes upon instructions from outsourcer, Cloud Computing providers are not involved into the processes carried out by means of the cloud, as mentioned earlier, they provide a do-it-yourself tool that can be used for the purposes determined solely by users of the service (outsourcer). In general, IT Outsourcing and Cloud Computing create the same risks for the business, Cloud involves similar trust and regulatory issues[63]. A variety of them will be assessed in the next chapter, in order to establish whether they are tackled by the same legal norms as Outsourcing usually is or require additional assessment or different perspective.

This author refrains from placing Cloud Computing at a certain place in the IT Outsourcing in order to be able to examine different aspects of Cloud Computing services regardless of the type of cloud. However, the author would like to sum up the finding that will be further discussed in following chapters. First of all, Cloud Computing cannot be seen as a defined type of service, because there are so many definitions out there that single one would not fit every and each service offered on the market under the name Cloud Computing. Secondly, Cloud Computing is rather a concept of providing services of different types and models meeting certain criteria, generally set up by NIST definition (rapid scalability, elasticity, on-demand self-service). Thirdly, Cloud Computing can be seen as a model of providing IT Outsourcing services, since traditional Outsourcing providers offer them to the same (or new) customers. Finally, when it comes to traditional IT Outsourcing services and Cloud Computing, there are no significant differences between them in terms of private cloud, apart from

[63] Chow *et al.* Controlling Data in the Cloud: Outsourcing Computation without Outsourcing Control. ACM Workshop on Cloud Computing Security, 2009, p. 85.

few aspects (e.g. data processing, SLA). Public cloud raises far more questions in the light of IT Outsourcing and is a subject to more extensive analysis in the following chapter.

2. Cloud Computing in the context of IT Outsourcing legal framework

As it has been established in the previous chapter, Cloud Computing is not a new technology itself, it rather anticipates business relations between a service provider and client that are different from the ones in traditional IT Outsourcing. Nevertheless, from a business perspective, taking an advantage of Cloud Computing services provided by a third party is an Outsourcing deal, where outsourcer transfers previously or recently established function to the external service provider. Thus, this chapter will focus on different fields of law which are relevant to IT Outsourcing, and subsequently to Cloud Computing, assess whether relevant provisions will apply by analogy to IT Outsourcing or require a modified approach.

Fields to be assessed are trade regulations, for instance, General Agreement on Trade in Services (GATS)[64], data protection, competition law, IP rights protection, and contract law aspects. Two particular cases will be compared to make the comparison more specific. First one is a business entity using Cloud Computing services provided by an external service provider, where an entity is purchasing certain IaaS services (server and storage capacity, network, etc.). Infrastructure in question is used by the entity to process some data (including also personal data) of their own customers, for whom system deployed on this infrastructure may or may not be directly available. Cloud Computing services are provided in a public cloud (as it raises more concerns), but the author may sometimes refer to a private cloud as an alternative.

Having chosen case for Cloud Computing, it is easier to pick one for IT Outsourcing because the latter field is broader than former. Case to compare for IT Outsourcing would be outsourcer entering into an agreement with an external service provider for the provision of infrastructure and various middleware. Service provider owns the hardware, manages its installation, handles operating systems, firmware, and some middleware while outsourcer manages application part (either by himself or with a help of a different provider). The agreement may or may not include a transfer of employees and know-how, IP and other assets, hardware may or may not be installed on outsourcer's premises or in the same jurisdiction, the matter to be specified in each case.

[64] General Agreement on Trade in Services, 15 April 1994. The Results of the Uruguay Round of Multilateral Trade Negotiations, The Legal Texts (1994), 325, 33 ILM, 1167.

2.1. IT Outsourcing and Cloud Computing in the context of GATS

Outsourcing became a global trend in the last few decades which brought out a lot of political and regulatory issues, especially ones associated with Offshoring. In the previous chapter we briefly addressed benefits and risks of Outsourcing from the perspective of business, current subchapter will discuss the topic of IT Outsourcing and Cloud Computing in the context of state policy and international agreements (i.e. General Agreement on Trade in Services). On the level of a state, besides the risks that are similar to business ones, such as loss of profit or competitiveness, certain additional issues appear, as possible raise of unemployment, state's obligation to ensure proper functioning of a financial system, citizens security, and protection of their personal data, etc. States are faced with a challenge of regulating Outsourcing in a way that is not going to harm international trade, but will still create value for the state itself.

Although Outsourcing is not a legal term, it can nevertheless be spotted in legal acts in certain jurisdictions.[65] It may not be directly addressed by legal instruments in each field of law, but Outsourcing relations are often subject to regulations on financial institutions, e-commerce, electronic media, data protection, labor law, etc. These regulations not only influence and form Outsourcing deals but also determine state's competitiveness on the global market. Even though the volume of services that moved offshore was considered to be insignificant in comparison with the merchandise import in 2006,[66] it continues to grow and every legal act adopted in this field matters. For example, because of China's preventive measures of filtering ingoing and outgoing network traffic (known as China's Firewall) loading object hosted outside of China takes few extra seconds,[67] which might potentially create complications for some Outsourcing deals, not to mention firewall's filtering system itself. According to Hindley *et al.* (2009), any disruption to online services has the direct commercial effect on the providers and because of the international dimension of modern trade in services one state has a power of influencing revenues of foreign service providers.[68]

---

[65] Jardin *et al.* Outsourcing: some legal aspects. www.legal500.com/assets/images/stories/firmdevs/nobl11898/outsourcing_-_some_legal_aspects_september_2008.pdf (26 September 2015). p. 1.
[66] Lapid, K. Outsourcing and Offshoring Under the General Agreement on Trade in Services. Journal of World Trade 2006, 40(2), p. 347.
[67] Berry *et al.* Policy Challenges of Cross-Border Cloud Computing. Journal of International Commerce and Economics 2012, 4(2), p. 27.
[68] Hindley *et al.* Protectionism Online: Internet Censorship and International Trade Law. ECIPE Working Paper 2009,

The quality of data protection policies, support of ICT development by government and freedom of information access are listed among ten factors determining environment for supply and consumption of new technologies, such as Cloud Computing.[69] Laws that could prevent business from engaging into Outsourcing differ, from less specific (e.g. data protection regulations) to more detailed, such as licensing scheme for the export of encryption software in the US which takes into account destination country and also the nationality of a recipient.[70]

Just as with trade in goods, coherent international framework covering trade in services is essential for cross-border trade as a whole. While international trade in goods has been regulated for a while by General Agreement on Tariffs and Trade (GATT)[71], services turned out to be more challenging subject for an international agreement to cover, that nevertheless found its reflection in GATS. The agreement serves as an instrument for states to make particular commitments in different sectors by granting market access and/or establishing national treatment regime. Although it has been criticized as lacking clarity and providing the inefficient instrument, it still remains the only attempt to regulate services on the international level. The fact it has been adopted more than two decades ago suggests that the agreement does not reflect the present state of the technology market, as it has developed rapidly during this period. Thus, it is hardly surprising that in the context of IT and telecommunications GATS appear to be fuzzy.

2.1.1. Applying GATS provisions to IT Outsourcing

There are a few uncertainties as to Outsourcing in general and especially to IT Outsourcing. First of all, the agreement does not provide a definition of a service, except stipulated in Article XXVIII (b), where the supply of a service is defined as including "the production, distribution, marketing, sale and delivery of a service"[72]. It creates difficulties in assessing the scope of the Agreement which Footnote 9 to Article XVI[73] complicates even further by distinguishing between

12/2009. p. 2.
[69] Cloud Readiness Index 2014, Asia Cloud Computing Association's. www.asiacloudcomputing.org/images/research/ACCA_CRI2014_ForWeb.pdf (26 September 2015).
[70] Weiss *et al.* Outward Bound: Considering the Business and Legal Implications of International Outsourcing. Georgetown Journal of International Law 2007, 38, p. 744.
[71] General Agreement on Tariffs and Trade 1994, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, The legal texts: The Results of the Uruguay Round of Multilateral Trade Negotiations 17 (1999), 1867 U.N.T.S. 187, 33 I.L.M. 1153 (1994).
[72] Ibid, art. XXVIII(b).
[73] Ibid, p. 297.

core services and inputs for its supply that are not covered by GATS, with no official clarifications given. As to another aspect of the uncertainty, namely differentiation between goods and services, it seems that Cloud Computing would generally be regarded as a service while IT Outsourcing could potentially include trade in goods (e.g. when it anticipates supply of hardware). However, would Cloud Computing, for example, include electronic delivery of software, the picture becomes less clear.[74]

Secondly, it is neither established nor agreed under which mode of supply IT Outsourcing services are provided. In accordance with a definition provided in the Article 1(2) of GATS Outsourcing belongs to the Mode 1, it meaning so-called arm-length supply, under conditions of which both buyer and supplier remain in their respective locations. However, another question remains, it being whether electronic delivery of such services should always be treated as a cross-border trade or in some particular situations can be treated as a consumption abroad, which would make it qualify for Mode 2.[75]

The third challenge is rules of origin which are not precisely defined, that results in uncertainties for IT and telecommunications services delivered over the Internet. Subcontracting could further complicate the matter since a country of the establishment as an instrument of determining the identity of a service provider may not be an optimal solution. There is a risk that companies could simply place employees in certain jurisdictions in order to take advantage of particular preferences scheme.

Last, but not the least, GATS is designed as a positive list of obligations, meaning that states are bound only in those particular fields they made commitments for. As certain services might be difficult to place under the classification set up by GATS, there is always a risk of restrictions being enforced upon them, as states are not obliged to take any actions in regards to fields they made no commitments for. Scholars made suggestions of modifying GATS to contain a negative list instead,

[74] Wu, T. The World Trade Law of Censorship and Internet Filtering. Chicago Journal of International Law 2006, 7(1), p. 268.
[75] Mattoo *et al.* Preempting Protectionism in Services: The GATS and Outsourcing. Journal of International Economic Law 2004, 7(4), p. 775.

meaning that states would offer market access and national treatment in regards to all the services except those explicitly excluded by commitments.[76]

Accordingly, many scholars share the view that GATS is rather representing status quo than actual rollback of restrictions and progress is yet to be made.[77] While liberalization in most sectors is still a long way away, Annex on Telecommunications[78] is binding all the World Trade Organization (WTO) members to the certain commitments. The Annex applies to all the members, regardless of whether they are bound by commitments on telecommunications under the GATS and "guarantees that whenever a WTO member has made specific market access and national treatment commitments for a particular service sector or subsector (e.g., financial, professional, advertising, publishing, audio-visual, health or education), the commitments will also apply to those services sectors and subsectors when delivered in electronic form"[79].

2.1.2. IT Outsourcing and Cloud Computing commitments under GATS

IT Outsourcing and Cloud Computing are not covered by a single sector, usually they are considered to fall under the sector 1.B Computer and Related Services and 2.C Telecommunication services. Commitments under the 1.B sector are usually more specific, for example, European Union (which is a separate member of WTO) made commitments for all the categories within this particular sector, abolishing any limitations on Market Access or National Treatment for services supplied in Mode 1 and Mode 3. For the 2.C sector EU made commitments not to impose limitations on National Treatment and Market Access for all the categories of services under Mode 1 and 3 of supply, specifically listing Mobile and personal communications services and systems under the Other category. Nevertheless, certain members of European Union (EU) maintain some restrictions on Market Access for both Modes and broadcasting is explicitly excluded from the Schedule.

Unsurprisingly, GATS schedules of commitments lack any direct commitments to Cloud Computing, but it is still possible to define few categories that could possibly cover it. Relevant

[76] Lapid (2006), *supra* nota 66, p. 359.
[77] Sauve, P. Assessing the General Agreement on Trade in Services: Half-Full or Half-Empty? Journal of World Trade, 1996, 29(4), p. 142.
[78] Annex on Telecommunications. General Agreement on Trade in Services, 15 April 1994. The Results of the Uruguay Round of Multilateral Trade Negotiations, The Legal Texts (1994), 325, 33 ILM, 1167.
[79] Bressie *et al.* Telecommunications trade liberalization and the WTO. 15th ITS Biennial Conference Berlin, 2004. www.hwglaw.com/siteFiles/News/69A7C2994A9A82580D112146E5FB0E0C.pdf (26 September 2015). p. 7.

categories are listed under Computer and related services sector and Telecommunications sector, which are also usually attributed to IT Outsourcing. Based on a particular model, Cloud Computing could be classified under following categories: 1.Bb Software implementation services, 1.Bc Data processing services, 1B.d Data base services, 2.Cb Packet-switched data transmission services, 2.Cj On-line information and data base retrieval, 2.Ck electronic data interchange (EDI), 2.Cn on-line information and/or data processing and possibly even 2.Ch Electronic mail. As apparent, single service could possibly fall under a variety of categories, requiring substantial harmonization in place to secure uninterrupted trade flow.

In 2005 EU made a proposal[80] to modify the structure of classification for telecommunication sector and use the definition that can be found in Annex on Telecommunications, where it is defined as "the transmission and reception of signals by any electromagnetic means"[81]. It also highlighted the inconsistency in the schedules of commitments caused by states using different classifications, both Services Sectoral Classification List (so-called W120)[82] and the Central Product Classification (CPC)[83] developed by the United Nations Statistical Commission. Various inconsistencies were spotted in the framework, such as W120 list not being technology neutral (it differentiates between packet-switched and circuit-switched transmission), services that do not fit current classifications, the existence of overlapping categories, confusing linkage to CPC, and CPC itself being outdated. The EU approach was perceived as evolutionary and positively accounting for the state of the telecommunications market, but unlikely to succeed in the conservative environment of trade negotiations.[84]

In 2011, U.S. made a proposal[85] to include into the discussion on e-commerce such topics as mobile applications and Cloud Computing, thus widening the framework of e-commerce negotiations. In regard to Cloud Computing, the challenge of overlapping categories has been acknowledged by

[80] Classification in the Telecom Sector under the WTO-GATS Framework. Communication from the European Communities, 2005, TN/S/W/27, S/CSC/W/44.
[81] Annex on Telecommunications. General Agreement on Trade in Services, 15 April 1994. The Results of the Uruguay Round of Multilateral Trade Negotiations, The Legal Texts (1994), 325, 33 ILM, 1167. Article 3(a).
[82] Services Sectoral Classification List, World Trade Organization. MTN.GNS/W/120 document of 10 July 1991.
[83] The Central Product Classification (CPC): Version 1.1. New York: United Nations, 2004.
[84] Weber *et al.* Classification of Services in the Digital Economy. Springer, Zürich, 2012. p. 102.
[85] Work Program on Electronic Commerce: Ensuring that Trade Rules Support Innovative Advances in Computer Applications and platforms, such as Mobile Applications and the Provision of Cloud Computing Services. Communication from the United States, 2011, S/C/W/339.

Communication and uniform approach suggested, that nevertheless would require additional consultations among WTO members.

As to the scale of harmonization, 108 WTO members in total have made commitments for telecommunications services, out of which 99 committed to extended competition in basic telecommunications (fixed and mobile telephony, real-time data transmission etc.) and further 82 committed to the Reference Paper[86], defining competitive safeguards, interconnection principles, public availability of licensing criteria, universal services, independent regulators and allocation and use of scarce resources.[87] In computer-related sector, figures were even smaller, with 56 members maintaining commitments for software implementation and 54 for data processing (which is less than a half of members), with only half of those commitments guaranteeing market access or unqualified national treatment.[88]

As apparent, Cloud Computing, in general, causes same question in the context of GATS as IT Outsourcing does, it being Modes of supply, rules of origin, categories covering particular services and even differentiation between goods and services. The structure of the GATS itself (positive list of obligations) makes it difficult to rely on the schedules of commitments as each state is free to phrase them in its own fashion. Recent interest in an open dialogue on Cloud Computing under GATS leaves a hope of eventual resolution of the uncertainties, which would also contribute IT Outsourcing field in general since it is obviously too broad to be tackled at once.

2.2. IT Outsourcing and Cloud Computing services in the context of Data Protection

Data Protection is probably the most widely discussed legal topic in the context of Cloud Computing and certainly the one coming up during the negotiation of IT Outsourcing agreements. Growing ability to process data remotely, nearly unlimited capacities of data storage systems along with the emergence of next day technologies operating data in unconventional ways, generating unanticipated outcomes - all of this might make parties feel like they are losing control over the assets or are not complying with the relevant regulatory requirements. Much have been written on the topic

[86] World Trade Organization, Negotiating Group on Basic Telecommunications, Reference Paper, 1996.
[87] Telecommunications services. www.wto.org/english/tratop_e/serv_e/telecom_e/telecom_e.htm (26 September 2015).
[88] Mattoo *et al.* India and the Multilateral Trading System after Seattle: Toward a Proactive Role. The World Bank, Policy Research Working Paper 2379, 2000.

of data security and protection from technical, business and legal perspectives, nevertheless vast majority of researches appear to adopt a rather limited approach and focus on the specific aspects only. In the current subchapter, the topic of Data Protection in IT Outsourcing and Cloud Computing will be assessed in the light of EU law with some references being made to the technical literature and established standards in the field of Information Technology.

First of all, it is worth mentioning that technical literature usually distinguishes data from information, defining data as "a subset of information in an electronic format that allows it to be retrieved or transmitted" [89] and information as "an instance of an information type… communication or representation of knowledge"[90], regardless its format. Another common distinction is made in terms of content, where data constitutes a set of raw facts and information is a piece of data with a specific meaning or function that can be obtained e.g. by processing the data. Nevertheless, when considering measures to secure either information or data, term information security is usually used, as constituting "protection of information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide confidentiality, integrity, and availability"[91]. The reason behind it is probably an intention to cover information of various types and not to restrict the protection to the electronic form.

2.2.1. Data security objectives

Confidentiality, integrity and availability (often referred together as CIA) are the main objectives of information and data security, appearing in various industry and government standards. International Organization for Standardization (ISO) issued an updated standard on Information security management systems[92] which uses the definitions set out in the Standard ISO/IEC 27000, cited in the previous chapter. It defines confidentiality as the "property that information is not made available or disclosed to unauthorized individuals, entities, or processes"[93], availability as "the

[89] Kissel, R. Glossary of Key Information Security Terms. National Institute of Standards and Technology, Information Technology Laboratory, 2013. nvlpubs.nist.gov/nistpubs/ir/2013/NIST.IR.7298r2.pdf (26 September 2015). p. 58.
[90] Ibid, p. 92.
[91] Ibid, p. 94.
[92] ISO/IEC. 27001:2013 Information technology -- Security techniques -- Information security management systems – Requirements. International Organization for Standardization, Geneva, Switzerland.
[93] ISO/IEC. 27000:2014 Information technology - Security techniques - Information security management systems - Overview and vocabulary. International Organization for Standardization, Geneva, Switzerland. p. 2.

property of being accessible and usable upon demand by an authorized entity"[94] and integrity as "the property of safeguarding the accuracy and completeness of assets"[95]. Estonian IT baseline security system (ISKE) based on German information security standard IT Baseline Protection Manual, introduced in 2004 operates the same objectives, adding Delay as an extra category that constitutes time critical availability according to which security class is assigned to each separate piece of data.[96]

In the legal context, however, data and information are not differentiated and terms are used interchangeably. As, for example, in EU Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data[97] (hereinafter Data Protection Directive) which stipulates that "principles of protection must apply to any information…"[98] and defines personal data as "any information relating to…"[99]. Rather than distinguishing information by the format, legal acts in general differentiate it by the content, recognizing such categories of data as personal data and sensitive data. One could make an assumption that for the matter of law threats to data security originate not from the form it is stored or transmitted in, but rather from the content itself.

The Council of Europe Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (often referred to as CoE 108)[100] was among the first regulations explicitly addressing data protection in Europe and is certainly the most influential as it is opened for non-members of the Council of Europe and currently is legally binding for 47 states. Principles set out in the Convention have later been incorporated into EU law, in Data Protection Directive in 1995 and further into the Charter of Fundamental Rights[101].

[94] Ibid, p. 2.
[95] Ibid, p. 5.
[96] Three-level IT baseline security system ISKE. www.ria.ee/iske-en (26 September 2015).
[97] Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, OJ 1995, No. 281, 23.11.1995.
[98] Ibid, recital 26.
[99] Ibid, art 2a(a).
[100] CoE, Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, Council of Europe, CETS No. 108, 1981.
[101] Charter of Fundamental Rights of the European Union, OJ 2012 No. 326, 26.10.2012.

CoE 108 Convention and Data Protection Directive define key principles of Data Security[102] (former) and Security of data processing[103] (latter). Although neither of regulations uses CIA terms, wording suggests that the drafters had them in mind. Confidentiality is expressed in measures against accidental access or dissemination (CoE 108) and unauthorized disclosure or access (Data Protection Directive); availability – in measures against accidental or unauthorised destruction or accidental loss (CoE 108) and accidental or unlawful destruction (Data Protection Directive); integrity – in measures against alteration (both CoE 108 and Data Protection Directive). In the context of EU law confidentiality, integrity and availability terms are expressly defined only in Regulation 460/2004 on the establishment of European Network and Information Security Agency (ENISA)[104] and solely for the purpose of the Regulation.

2.2.2. EU Data Protection regulations

Unlike IT security standards, data protection legislation does not address all types of data. While data security can and often is a subject to the contract provisions, regulations concern only the certain specific categories. The main EU legislative act in this field is, as mentioned before, Data Protection Directive, which is limited in scope both by subject and by actors. First of all, it applies only to the personal data which is "any information relating to an identified or identifiable natural person… who can be identified, directly or indirectly"[105] and is being processed wholly or in part by automatic means. For the purpose of the Directive processing of personal data means "any operation or set of operations… such as collection, recording, organization, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, blocking, erasure or destruction"[106]. EU legislation on data protection is considered to have a data-centric structure,[107] however, the location of such personal data itself, citizenship or residence of a data subject is not decisive.[108] Secondly, it applies only to the data

[102] CoE,*supra* nota 100, art 7.
[103] Directive 95/46/EC, *supra* nota 87, art 17.
[104] Regulation (EC) No 460/2004 of the European Parliament and of the Council of 10 March 2004 establishing the European Network and Information Security Agency, OJ 2004, Vol. 37, 13.3.2004.
[105] Directive 95/46/EC, *supra* nota 87, art 2(a).
[106] Ibid, art 2(b).
[107] Mantelero, A. Cloud computing, trans-border data flows and the European Directive 95/46/EC: applicable law and task distribution. European Journal for Law and Technology, 2012, 3(2). p. 3.
[108] Hon *et al.* Data Protection Jurisdiction and Cloud Computing – When are Cloud Users and Providers Subject to EU Data Protection Law? Legal Studies Research Paper No 84/2011, Queen Mary University of London. ssrn.com/abstract=1924240 (26 September 2015). p. 7.

controllers established in one of the EU Member States or those that are established in none of them, but use equipment that is situated within the EU.

Data controller can be a natural or legal person, public body which determines purposes and means of the processing,[109] while processor is the person which processes personal data on behalf of the controller.[110] It is important to note that "the roles in the processing activity are determined on the basis of the relationship with information, rather than by virtue of the nature of the inter-subjective relationship"[111]. Controller is a key figure in Data Protection Directive which has own obligations in regards to personal data and also is capable of allocating responsibility to the third parties.[112] In IT Outsourcing agreements data protection regulations would usually come into the picture when outsourcer has control over the personal data and entrusts processing of it, completely or partially, to the service provider. It may be the sole purpose of the Outsourcing contract (processing of personal data, e.g. sending out invoices) or outsourcing of a certain function, carrying out of which is touching upon personal data (e.g. backup of databases containing personal data). In typical IT Outsourcing agreements outsourcer will be regarded as a data controller and will have certain obligations associated with the role while service provider will remain a processor.

Controller has a variety of obligations, including general obligation to ensure that collecting of data is carried out for adequate and relevant purposes, that data is maintained accurate and up to date etc. But what is most relevant to IT Outsourcing agreements are the obligations related to the processing itself. First of all, it is an obligation to ensure fair and lawful processing of data, compatible with specific purposes.[113] Secondly, a controller is obliged to implement appropriate technical and organizational measures to protect personal data against threats defined in Article 17, cited above. Those measures should consider the state of the art and cost of implementation to ensure an appropriate level of security that corresponds to the nature of data that is to be protected.[114] Thirdly, and most importantly for Outsourcing relations, a controller has to choose a processor that provides sufficient guarantees in respect of the technical security and organizational measures governing the

[109] Directive 95/46/EC, *supra* nota 87, art 2(d).
[110] Ibid, art. 2(e).
[111] Mantelero (2012), *supra* nota 107, p. 3.
[112] Opinion 1/2010 on the concepts of 'controller' and 'processor'. Article 29 Working Party, WP 169, 00264/10/EN, Brussels, 16 February 2010. p. 4.
[113] Directive 95/46/EC, *supra* nota 87, art 1(b).
[114] Ibid, art 17.

processing of data and must ensure processor' compliance.[115] Finally, there must be a legally binding contract between controller and processor and the obligation to ensure appropriate technical and organizational measures to protect data must be binding for a processor as well.[116]

Processor, on the other hand, does not have specific obligations except to provide sufficient guarantees in respect of the technical security and organizational measures governing processing of data in question and to act only on the instructions from the controller. Perhaps the most important obligation for processor is one defined in Article 16, which stipulates that processor "must not process them except on instructions from the controller unless he is required to do so by law"[117].

For classic Outsourcing contracts, this regulation would not constitute a problem in terms of defining roles and understanding parties' responsibilities. Such type of deals are carefully planned and most of the times well documented. It is in outsourcer interest to ensure that service provider carries out his functions the way outsourcer requires it to be and that the provider has all the means for it, including support and necessary information provided by the outsourcer. Outsourcing agreements often involve a movement of workers that serves the purpose of bringing the expertise to the service provider and ensure a correspondent quality of service. In an example IT Outsourcing case, defined in the beginning of the current chapter, outsourcer would remain a data controller. As services provided to outsourcer covered only infrastructure installation and maintenance, it could be argued whether this is sufficient ground for a service provider to be named a data processor. Nevertheless, outsourcer would likely attempt to secure provider's compliance with technical and organizational measures in order to ensure its own compliance.

Applying Data Protection regulations to Cloud Computing is more challenging as the nature of the service itself does not anticipate much integration or cooperation between the parties, but rather takes a form of Cloud Computing provider supplying ready available tools to be used for whatever purposes by the client. Currently, clients would not expect Cloud Computing provider to offer a wide variety of options tailored specifically to their needs or to make changes into default configuration on-the-go (bearing in mind that it is a public cloud that is being considered). Thus, a question that arises

[115] Ibid, art 17(2).
[116] Ibid, art. 17(4).
[117] Ibid, art 16.

is whether Cloud Computing provider supplying merely means and acting only on the behalf of a client would be considered data processor. [118]

Undoubtedly, Cloud Computing provider would be a processor[119][120] or even a controller in regard to the data processing taking place without the instructions from the data controller side, if provider would, for example, conduct big data analysis or utilize the data in any way other than as instructed by the client. In that sense no particular difference exists between Cloud Computing provider and the service provider in IT Outsourcing context, a processor shall act only upon instructions from the controller as stipulated in Article 17 of the Data Protection Directive, which, however, in the view of scholars is ill-suited for the complex contracting practices in Cloud Computing.[121]

As pointed out in White paper on the proposed data protection regulation, many of Cloud Computing providers act as neutral intermediaries and it should be recognized.[122] Alternative approach is suggested - to add data protection to the scope of Article 5(b) of the E-Commerce Directive[123] or introduce similar exceptions for processors by analogy to the Article in the context of data protection regulations. It would not only set prerequisites to Cloud Computing provider's liability but also create an obligation to maintain adequate notice and takedown procedures.[124]

Another question that arises from a client using Cloud Computing services in a public cloud is client's ability to ensure Cloud Computing provider’s compliance. Can one assume that client is in a position to take responsibility for Cloud Computing provider compliance in the light of short-term, pay-per-use contracts that do not require extensive negotiations? Cloud Computing services have been promoted, also by the EU Commission, as beneficial for the newly established businesses and small

[118] Opinion 05/2012 on Cloud Computing. Article 29 Working Party, WP 196, 01037/12/EN, Brussels, 1 July 2012. p. 4.
[119] McGillivray, K. Conflicts in the Cloud: Contracts and Compliance with Data Protection Law in the EU. Tulane Journal of Technology and Intellectual Property, 2014, 17, p. 241
[120] Mantelero (2012), *supra* nota 107, p. 3.
[121] Hon *et al.* White paper on the proposed data protection regulation, Cloud Accountability Project, WP25, 2014. www.a4cloud.eu/sites/default/files/D25.1%20White%20paper%20on%20new%20Data%20Protection%20Framework.pdf (26 September 2015). p. 23.
[122] Ibid, p. 21.
[123] Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market, OJ 2000, No.178, 17.07.2000.
[124] Hon *et al.* (2014), *supra* nota 121, p.21.

and medium enterprises because of its convenience and rather low initial investments required.[125] The question is whether it would be feasible to slow the process down by forcing potential clients of Cloud Computing services to give up on a public cloud out of fear of breaking compliance rules by not being able to guarantee Cloud Computing provider's obligations. Hon *et al.* (2014) suggest in this matter that substantial test is to be adopted, where controllers which took appropriate measures to prevent a breach of data protection obligations would not be liable for such a breach.[126]

2.2.2.1. Proposed General Data Protection Regulation

Expectations were high for a proposed General Data Protection Regulation[127] to tackle the numerous uncertainties as to the application of current framework to the new types of business relations enabled by the emergence of new services, including Cloud Computing. Proposal for a Regulation was presented in 2012 and is still awaiting its final adoption, however, at the present it seems that proposed Regulation (at least in its current wording) would have to be refined in order to clarify uncertainties created by the Data Protection Directive currently in force and also those additional raised by the proposed Regulation itself.

Under the General Data Protection Regulation substantial scope of data protection law remained untouched, while territorial scope has been rephrased and modified.[128] A much discussed concept of "use of equipment" has been removed and substituted with third country controllers or processors with no EU establishment, which are offering goods or services to data subjects or monitoring their behavior.[129] This clause has obviously in mind targeting online retailers and Cloud Computing providers offering services to natural persons, as well as companies dealing with studying consumer behavior and profiling. However, in the current wording, Cloud Computing providers offering services to the enterprises which, in turn, by means of these services process personal data,

[125] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Unleashing the Potential of Cloud Computing in Europe, 27.9.2012, COM(2012) 529. eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0529:FIN:EN:PDF (26 September 2015).
[126] Hon *et al.* (2014), *supra* nota 121, p. 18.
[127] Proposal for a Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation), COM 2012 (011) final eur-lex.europa.eu/legal-ontent/EN/TXT/PDF/?uri=CELEX:52012PC0010&from=en (26 September 2015).
[128] Schellekens, B.J.A. The European Data Protection Reform in the light of Cloud Computing (Master's thesis). Tilburg University, 2013. njb.nl/Uploads/2014/4/Master-thesis-Bart-Schellekens.pdf (26 September 2015). p. 43.
[129] Proposal for a Regulation (2012), *supra* nota 127, art. 3(2).

would not be covered by this particular clause because they are not offering Cloud Computing services to the data subjects themselves.

Concepts of data controller and data processor remained unchanged, unlike their obligations and accountability, which have been widened. As with the current Data Protection Directive, application of roles to Cloud Computing services is unclear. Hon *et al.* (2014) once again, now in the context of the proposed Regulation, stress upon the fact that overbroad accountability of data controller is not in line with the particular circumstances of Cloud Computing, where client is not able to control the way Cloud Computing provider handles the data to the full extent.[130] Consequently, Cloud Computing provider should not be named a processor, as no instructions are given to it by the client and it does not actively process the data.[131] As follows, proposed Data Protection Regulation is still better suited for traditional Outsourcing deals with outsourcer controlling service provider and actually accessing the data solely through it.

Alternative ways of dealing with data protection under Cloud Computing have been proposed, one of them being to abolish controller-processor concept and to "vest the data controller title, rights and obligations upon anyone processing personal information, regardless of its means, conditions or purposes"[132]. Another one is not to treat encrypted personal data as personal data in relation to those who do not possess an encryption key (Cloud Computing provider would be one of them in most cases).[133] The main reasoning behind it is that it would be inappropriate to apply data protection obligation to persons who de facto do not have access to the data. Following the same logic, transfer of data would occur only if the recipient can actually access it.[134] Another aspect of encrypted or anonymized data is that process of accomplishing it could be considered as a processing of data under the Data Protection Directive and would require data subject's consent.[135]

[130] Hon et al. (2014), supra nota 121, p. 46.
[131] Hon *et al.* Who is responsible for "personal data" in cloud computing? - The cloud of unknowing, Part 2. International Data Privacy Law, 2012, 2(1), pp. 3-18.
[132] Hert *et al.* The proposed data protection Regulation replacing Directive 95/46/EC: A sound system for the protection of individuals. Computer Law & Security Review 2012, 28(2), p. 133 – 134.
[133] Hon *et al.* (2012), *supra* nota 131, p. 14.
[134] Ibid, p.33.
[135] Hon *et al.* The problem of "personal data" in cloud computing: what information is regulated? – The cloud of unknowing. International Data Privacy Law, 2011, 1(4), p.214.

2.2.3. Data protection legislation addressing data security objectives

Going back to confidentiality, integrity and availability criteria for information security, both current and proposed regulations touch upon it and provide a set of tools to secure. As for data confidentiality, most of both Data Protection Directive and proposed Regulation are dealing with this aspect. It is mainly reflected in obligations not to disclose information and requirements as to the location of data itself. The latter is arguable in today's realities, where data is no longer accessed physically, but is a part of a global network. In fact, physical break in into the data center where data is stored is more unlikely than a cyber-attack via the Internet. One could ask if location matters at all in current circumstances.

A threat to the data located abroad which clearly gets most of the attention is law enforcement by the respective foreign government, that is, or more accurate, was addressed by Safe Harbor which will be mentioned below. But even if the hardware on which part of the information is stored was seized and all the parts of such information were retrieved from different hardware components, it still might not be possible to combine it into the usable data. So even if we someone in remote jurisdiction seizes physical hardware, data retrieved will usually not be usable unless Cloud Computing provider is willing to cooperate. But then again, if data is encrypted, it would not be possible to retrieve it even with the help of Cloud Computing provider unless encryption is weak and keys are stored by the provider. One could doubt encryption techniques security as well, but if data is that sensitive, it is probably not going to be kept in the public cloud anyway.

Availability criteria has been addressed as well, especially by Regulation proposal, which requires interoperability and data portability.[136] It has been criticized as creating high burden for Cloud Computing providers and also constituting Competition law concern.[137] But the current wording of the clause[138] allows only data subjects to receive the data in a widely used format, thus provision does not address for example availability of the data to the outsourcer who is not data subject and entrusts

[136] Proposal for a Regulation (2012), *supra* nota 127, art. 18.
[137] Swire *et al.* Why the Right to Data Portability Likely Reduces Consumer Welfare: Antitrust and Privacy Critique. Maryland Law Review, 2013, 72(2), p. 336.
[138] Proposal for a Regulation (2012), *supra* nota 127, art.15.

it for processing to a service provider. Equally, clients who use Cloud Computing services would not be entitled to benefit from the provision when they are processing data they are not the subject of.

As to integrity, confidentiality aspect has been over-addressed meaning that undertaken steps are supposed to minimize the risks of unauthorized parties modifying information. If one would go for establishing such a resource-demanding obligations as interoperability and portability, it would make sense to introduce requirements for the systems handing personal data that would ensure its integrity. Perhaps such as log functions tracking access of data and its modification that would enable data subjects to control data integrity, similar to the one Estonian ID-cards system has. Moreover, with constantly growing adoption of Cloud Computing one should bear in mind that it anticipates a number of data transfers over the public networks, so one should consider integrity of data in the course of such transfers.

Safe Harbor as a tool of regulating data transfers outside of EU[139] was included into proposed Regulation, but since one of the decisions[140] has recently been invalidated by the European Court of Justice ruling[141], the Commission will have to work on the alternative way of ensuring safe data transfers abroad. Safe Harbor once again addresses confidentiality aspect and aims to prevent unauthorized parties in third countries from accessing and processing personal data. But in information security server location matters a little, while other security measures such as network configuration, firewalls, and strong authentication methods do the job. Substituting Safe Harbor with a new system should be done taking into the account possible technical measures. The old system applied similarly in the IT Outsourcing and Cloud Computing context, but for IT Outsourcing it was easier to circumvent it by placing servers in approved jurisdictions or within the EU but letting personal from third countries operating the data. For Cloud Computing it was far more difficult to circumvent it in case of a public cloud and one option would be once again to go with a private cloud.

MacDonald *et al.* (2014) ask similar questions, as, for example whether borders matter at all in achieving data security if there would be adequate security standards in force and data subject would

[139] Decisions adopted pursuant to Article 25(6) of the Data Protection Directive
[140] Commission Decision of 26 July 2000 pursuant to Directive 95/46/EC of the European Parliament and of the Council on the adequacy of the protection provided by the safe harbour privacy principles and related frequently asked questions issued by the US Department of Commerce 2000/520/EC, OJ L 215, 25.08.2000.
[141] CJEU 6.10.2015, C-362/14, *Schrems v Data Protection Commissioner*.

give their unambiguous consent.[142] They go even further and raise a question whether current framework could constitute unjustified discrimination of trade and actually prevent business from pursuing advantages by exploiting multinational data.[143] The question is interesting and will be further elaborated in succeeding subchapter on Competition law.

2.2.4. Conclusions

It is important to note that most of the concerns that were mentioned in this subchapter in regard to Cloud Computing can be circumvented by building own private cloud instead of using a public one, but it then increases costs and leaves client with less flexibility in rapid scaling of resources, which is one of the main benefits of Cloud Computing. Data Protection regulations are more or less clear in regard to conventional Outsourcing while remaining inefficient for Cloud Computing. It means that regulations failed to acknowledge recent developments in technology and continuously evolving business relations.

It can be summarized that in the case of IT Outsourcing roles prescribed by the Data Protection Directive are more or less clear and parties usually are able to hold each other accountable because the contracts are tailored and mostly concluded for a long-term. Parties to the contract integrate to the certain extent, by for example sharing expertize or moving employees. As for Cloud Computing roles are not clear because of complicated relations between parties themselves. Offered services are not tailored to the specific client unless it is a private cloud that is build and client has fewer possibilities to hold Cloud Computing provider liable since contract clauses are usually standard ones, favoring the provider and also short-term, without a possibility to modify.

As apparent, applying data protection regulations to Cloud Computing by analogy with IT Outsourcing is not feasible. Firstly, business relations between Cloud Computing provider and client are different from IT Outsourcing ones, and the same allocation of roles and responsibilities may be unjustified. Secondly, business models are different, and while in IT Outsourcing outsourcer seeks long and lasting partnership, Cloud Computing does not anticipate the same level of cooperation. Thirdly, in the light of abovementioned, outsourcer would rather cooperate with his own IT Outsourcing provider to take an advantage of Cloud Computing (as IT Outsourcing providers try to

[142] MacDonald *et al.* Personal Data Privacy and the WTO. Houston Journal of International Law 2014, 36(3), pp. 646-647.
[143] Ibid, p.648.

catch up on recent developments they offer Cloud Computing services along with traditional ones, which has been mentioned in the previous chapter) rather than approach external Cloud Computing provider and use a public cloud.

Finally, this subchapter focused on the simplest scenarios within IT Outsourcing and Cloud Computing and yet there are many question marks, in fact even more taking into account proposed General Data Protection Regulation. Provisions not only fail to consider Cloud Computing but even some aspects of traditional IT Outsourcing. A substantial review has to be made to provide more effective and feasible framework, acknowledging different areas of law, including competition law and IP rights protection, which would be discussed in following subchapters.

2.3. IT Outsourcing and Cloud Computing in the context of Competition law

Competition law seeks to promote competition in different markets, protect consumer welfare, stimulate innovation and also to protect interests of businesses. It is obvious that some of these goals can contradict with each other, so comprehensive policy is necessary to balance all the interests and to adopt appropriate and effective measures. Competition is perceived differently by legal scholars, it can constitute the end goal of competition policy or rather be a continuous process which competition policy seeks to secure. According to Luciano *et al.* (2011), for example, Competition law has as an objective to "protect the process of competition and enhance consumer welfare"[144], while according to Botta (2011) the end goal of Competition law is "free competition in the market, which results in maximization of consumers' welfare"[145].

States exercise their competition policy by adopting *ex ante* and *ex post* regulations. The former type of legislation is usually covering the certain field and has the aim to prevent monopolization of the certain market and hamper anticompetitive conducts or abuses of dominant position by market participants. The latter type of regulations deals with situations where competition has already been distorted by the particular behaviour of market participants. In the context of EU

[144] Luciano *et al.* Ensuring competition in the Clouds: The role of competition law? ERA Forum 2011, 12(2), p. 266.
[145] Botta, M. EU Competition Law and its Relevance for the Technology Industry. Institute for European Integration Research, Austrian Academy of Science, 2011. techlaw.univie.ac.at/fileadmin/user_upload/inst_unternehmensrecht/Wahlfachkorb_Technologierecht/WS_11/Botta.pdf (26 September 2015). p. 4.

law, *ex post* regulations are the same for any market, although slight differences exist as to exceptions introduced for the particular industries.

Four instruments dealing with distortion of competition are established by EU Competition law, these are Articles 101 and 102 of the Treaty on the Functioning of the European Union (TFEU)[146], Article 107 TFEU and the EC Merger Regulation[147]. Article 101 TFEU is dealing with either horizontal or vertical anticompetitive agreements, Article 102 with abuse of dominant position, Article 107 with state aid which is incompatible with Competition law and, finally, EC Merger Regulation regulates mergers that may potentially distort competition in relevant markets.

2.3.1. IT Outsourcing and competition regulations

In the context of IT Outsourcing, application of Articles 101 and 102 is rather straightforward, and the outcomes of eventual investigations under these provisions depend on the particular market, position of Outsourcing service provider and also the type and significance of the conduct itself. A subject that proves to be more complicated is the regulation of mergers, in the context of which IT Outsourcing is discussed most often. Transactions that constitute concentration[148] and have Community dimension[149] are subjects to EU legislation on mergers.

Outsourcing is seen as a tool for achieving a competitive advantage as a size of companies often creates inflexibility and results in diseconomies of scale.[150] Nevertheless, EU lacks a clear and consistent approach to outsourcing transactions under Regulation 139/2004 (the Merger Regulation).[151] Apart from community dimension aspect, which is usually difficult to assess in different circumstances as well, not only in the case of IT Outsourcing, the definition of concentration raises an even more challenging question. While it is obvious that Outsourcing agreement between companies in the same group is not subject to Merger Regulation because it does not satisfy conditions

[146] Consolidated Version of the Treaty on European Union OJ C 326, 26.10.2012.
[147] Regulation 139/2004 on the control of concentrations between undertakings (the EC Merger Regulation) OJ L 24, 29.1.2004.
[148] Ibid, art. 3.
[149] Ibid, art.1.
[150] Lohrberg *et al.* Outsourcing Transactions and Merger Control. European Competition Law Review, 2008, 6, p. 349.
[151] Ibid, p. 349.

set forward in Article 3 of the Regulation[152] (no change of control is taking place), the picture is not entirely clear in the event of Outsourcing agreement concluded with an external service provider.

Outsourcing deals can be different depending on their scope, ranging from simple ones, merely providing certain service to more complex, involving a transfer of employees and assets. Here is where the Merger Regulation comes into the picture. Whether such type of deals could be regarded as concentration depends on the fact whether assets or employees that are being transferred to Outsourcing service provider were used or are used not only to provide service internally within the company, but also to provide services to external clients. In the case of the latter, such Outsourcing agreement would most likely be classified as a concentration.[153] In the case of the former, such agreement would not be a concentration unless these new assets would enable Outsourcing service provider to supply not only outsourcer but also the third parties.[154]

While the transfer of internal IT department would usually not be a concern here, other complex Outsourcing deals would probably be a subject of a comprehensive investigation by both parties. Such Outsourcing agreement could also potentially become a subject to the Commission's evaluation according to the Technology Transfer Block Exemption Regulation[155] in the event where a transfer of assets also includes IP rights which are to be exploited in the course of production of a certain product.

2.3.2. Cloud Computing and competition concerns

When it comes to Cloud Computing, a challenge of defining a relevant market is the one that emerges directly because of no single definition of Cloud Computing itself. The first question is whether Cloud Computing is a new market or is simply a part of the larger market for IT services.[156] Subsequent questions are whether markets should be differentiated by the type of cloud (public or private) and, similarly, whether markets should be differentiated on the basis of providers, where there are traditional IT Outsourcing companies providing Cloud Computing services and other providers.

[152] Regulation 139/2004, *supra* nota 147, art. 3.
[153] Lohrberg *et al.* (2008), *supra* nota 150, p. 349.
[154] Ibid, p. 349.
[155] Regulation 316/2014 of 21 March 2014 on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of technology transfer agreements, OL J 93, 28.03.2014.
[156] Sluijs *et al.* (2012) Cloud Computing in the EU Policy Sphere Interoperability, Vertical Integration and the Internal Market. Journal of Intellectual Property, Information Technology and E-Commerce Law 2012, 4(1). pp. 1

Also, difficulties may emerge in defining the service in question itself. There are many providers offering Cloud Computing services, but since there is no conformity on what it actually includes, one should assess the substance of the service rather than rely on the commercial naming.

There are two main scenarios where *ex post* regulations could apply to Cloud Computing providers, and these are an abuse of dominant position by Cloud Computing provider and anticompetitive agreements with Cloud Computing provider as a party. Another case, which does not directly relate to abuse from Cloud Computing provider side, but nevertheless could potentially influence the field is an abuse of dominant position by third parties with a direct effect on competition between Cloud Computing providers.

The first scenario, an abuse of dominant position by Cloud Computing provider, is the one that is often discussed in the context of portability and interoperability. The fear is that Cloud Computing provider could prevent interoperability with other providers' services and make it technically difficult or very costly to retrieve the data from its system in a format that would enable client to switch to another provider without an extensive effort. Such customer lock-in is likely to be occurring already, but the problem is that in order to trigger Article 102 TFEU application, certain Cloud Computing provider has to hold a dominant position in the relevant market. Even though exact figures on market shares in Cloud Computing sector are not available, it seems unlikely that any active provider currently enjoys such market shares.[157] Moreover, an abuse of dominant position is something that has to be proved as well as the mere existence of lock-in would not automatically constitute an abuse.

While in IT Outsourcing it would depend on the type of service and its configuration, in the case of public cloud most of the times service would require a transfer of data between the cloud and the client through Internet Service Provider (ISP).[158] These providers can substantially influence Cloud Computing services and potentially discriminate certain Cloud Computing providers, in which case it could become a subject for the breach of Article 102[159] investigation on either discrimination of certain providers or refuse to supply.[160] However, ISP providing services on different terms and conditions that depend on Cloud Computing provider's requirements as to capacity and quality would

[157] Ibid, p.19.
[158] Ibid, p.16.
[159] Consolidated Version of the Treaty on European Union, *supra* nota 146, art. 102.
[160] Ibid, p.21.

not constitute discrimination itself.[161] On the other hand, integration between ISP and certain Cloud Computing provider could potentially trigger an investigation for the breach of Article 101 TFEU[162], if the agreement between the parties is anticompetitive.

Taking into account abovementioned and the fact EU Competition law *ex post* regulations in this field are selectively enforced by the Commission, it is clear that those measures may not effectively safeguard competition in Cloud Computing market. Especially taking into account that the Commission "does not tend to be overly intrusive, in order to avoid hampering the technological development of the ICT sector in the EU, which is perceived to be a key sector of the EU economy"[163]. The Commission seems to acknowledge the need of addressing competition issues in *ex ante* regulations, as for example the General Data Protection Regulation includes free movement of data clause[164], seeking to secure data portability and interoperability. However, some are of the view that it is overly intrusive method creating high burden for Cloud Computing providers.[165] Same regulation has been criticized because of potentially discriminating clauses regulating data export abroad.[166] Although protection of data and data subjects is a legitimate purpose of the General Data Protection Regulation, critique suggests that it might not be sufficiently balanced with other purposes, for instance promoting the competition.

Another competition concern that has been acknowledged in IT Outsourcing field and applies equally to Cloud Computing are so-called data hostage terms in Outsourcing agreements.[167] These clauses provide IT Outsourcing provider with a possibility to hold outsourcer's data hostage until some obligations are fulfilled (such as payment). Data became one of the most valuable assets business has and in such a scenario outsourcer is in a less favourable position in a dispute over the terms of the agreement. Data availability can be critical to the outsourcer and because of data hostage terms his interests may be damaged. It became an issue, forcing outsourcers to shorten terms of the agreement and schedule a renewal every year in order to avoid such situations. Such clauses have yet to be

[161] Ibid, p.22.
[162] Consolidated Version of the Treaty on European Union, *supra* nota 146, art. 101.
[163] Luciano *et al*. (2011), *supra* nota 144, p. 271.
[164] Proposal for a Regulation (2012), *supra* nota 127, art.18.
[165] Swire *et al.* (2013), *supra* nota 137, p. 336.
[166] MacDonald *et al.* (2014), *supra* nota 142, pp. 646-647.
[167] Carpenter, R. H. Walking from Cloud to Cloud: The Portability Issues in Cloud Computing. Washington Journal of Law, Technology and Arts 2010, 6(1). p. 4.

addressed in Competition regulations, although scholars are calling for prohibiting them by the means of government intervention.[168]

Creating open standards for Cloud Computing has been suggested as an instrument for protecting competition and consumer welfare. Some call for de facto standards, ones "created by the market rather than by a standardization body"[169] to avoid excess government intervention into the still developing market. EU has made certain steps in this direction, which would be further discussed in the next chapter.

2.3.3. Conclusions

In the current subchapter, the author summarized questions arising from the application of *ex ante* regulations in the field of competition law to IT Outsourcing and Cloud Computing. The efficiency of the regulations could be challenged, especially in regard to Cloud Computing. While the most controversial topic in the context of Outsourcing is control of mergers, Cloud Computing services have yet to become a subject to the Commission's investigation. In the absence of jurisprudence on this point, different scenarios were shortly addressed in order to highlight the type of questions they raise. The subject of Cloud Computing under the Competition law is rather new, with few studies conducted on it, which were referred to by the author. However, safeguarding competition in Cloud Computing is widely discussed in the context of other fields of law, which suggests that there is a need for introducing relevant *ex ante* provisions to effectively address competition concerns.

2.4. Certain aspects of IP in the context of IT Outsourcing and Cloud Computing deals

Development of technology has for a long time posed a threat to the current IP right protection system. First it enabled reproduction of copyright protected material in physical form without a permission of rights holder, which started with printed material and recently reached basically everything thanks to the development of 3D printing. Later it enabled reproduction in digital form that requires a minimum amount of time and resources, can produce the unlimited number of copies, all

[168] Ibid, p.12.
[169] Markota, S. Cloud Computing from EU Competition law perspective. Student economic law review, 2013, 2, p.35.

of them being of the same quality. All these technologies caused harm not only to rights holders (by reproduction without permission), but also harmed consumers (application of exhaustion doctrine is unclear in regard to digital goods, which prevents resale of them).

Cloud Computing is not an exception, and it is often mentioned in the context of copyright, especially remote storage service which makes it more difficult to trace copyright infringer and seize materials. While it is certainly something that may harm business interests if it is entity's IP rights that are being infringed, in the context of IT Outsourcing and Cloud Computing IP rights are discussed in different circumstances, some of which will be assessed in this subchapter.

2.4.1. Licensing

One of the important aspects of IT Outsourcing which is related to IP is software licenses. Since software is protected by copyright, business entities using certain software have to comply with the terms of the particular license. In the case of IT Outsourcing agreement such as one in our example case where infrastructure installation and maintenance are handled by service provider, parties have to agree on their responsibilities in regard to licences e.g. who is going to acquire them and ensure compliance with the license terms. Usually the primary goal of the Outsourcing deal is not in saving money on software licenses, so these aspects often receive too little attention.[170]

IT Outsourcing agreement for a deal such as an example one should stipulate whether existing licenses (if any) will be transferred into service provider's responsibility and which party will be responsible for negotiating license agreements with the software provider, purchasing and owning licenses in the future. In case outsourcer wishes to retain these functions and negotiate provisions on his own, there should be a streamlined process in place to communicate terms of acquired licenses to a service provider so that delivery of services can occur without a delay which might be caused by a lack of license information. If a service provider is the one responsible for acquiring all the licenses in its own name, he should also bear the responsibility for compliance with the terms. If, for example, outsourcer is going to share infrastructure environment with provider's other customers (e.g. virtual

[170] Tijhus, F. Why License Management in Outsourcing Fails, Crayon. www.crayon.com/globalassets/pdfs/whitepapers/why-license-management-in-outsourcing-fails.pdf (26 September 2015). p.1.

server deployed on the shared infrastructure), he should make sure that software is licensed accordingly, and that license permits it.

Outsourcer's or service provider's authorization to contact external software vendor in case of problems will depend on the fact which of the parties owns a license and eventual support subscription. Generally, it's a good idea to authorize the service provider to do it even if the outsourcer is the one owning the license and subscription since service provider should be able to keep in touch with an external software vendor to resolve a problem. Resolution time can depend on provider's ability to effectively communicate with external vendors and shortening it is in outsourcer interest. An agreement could also stipulate what happens with the licenses upon agreement's termination to avoid unexpected situations in the future.

In the case of Cloud Computing, things are a bit different. For some time now Cloud has been used as a tool for simplifying license management and securing software vendor rights in it, by making it impossible to copy software or license key and distribute it further. Software as a Service has been a very popular concept among businesses targeting end-users, but in our case it is of less relevance. The focus of this subchapter is not a license for end-users for the use of software deployed in a cloud, but licenses relevant to IT Outsourcing deal as in our example case, where there is software necessary to manage underlying infrastructure resources (e.g. server or database).

As fairly noted, while Cloud Computing "has the potential to simplify the licensing and use of software, it has, in fact, only added to the problem"[171]. On-demand provisioning of resources requires quick allocation of licenses, which has to be done either automatically by cloud itself or by a client that would usually mean manually. Just as like in traditional IT Outsourcing deals, shared resources should be acknowledged by a license which may not allow it. Traditional methods of enforcing license compliance, such as keys (especially ones tied to hardware IDs) do not really fit cloud architecture.

Short-term allocation of licenses is something that is vital to Cloud Computing but rarely addressed in reality. Taking into account different incompatibility issues that may arise from moving an operation to a cloud environment, clients may need to deploy and test few different systems instead of going for one option from the very beginning, so time-limited trial licenses is something software

[171] McRoberts, M. Software Licensing in the Cloud Age, The International Journal of Soft Computing and Software Engineering 2013, 3(3). p. 401.

vendors would need to consider in this context. Also, there could be additional problems with hybrid clouds, where workload portability between them could be restricted by shortcomings of licenses in a private or public cloud. All of these features makes open source software better suited for Cloud Computing services, and it is thus widely used.[172]

Going back to our Cloud Computing case, where client purchases Infrastructure as a Service, the license would usually be provided as a service for all the necessary software. Amazon Customer Agreement, for example, grants a client limited, revocable, non-exclusive, non-sublicensable and non-transferrable license to access and use their services, which may comprise of components where Amazon or its affiliates or licensors own rights.[173] Thus license becomes just another resource, billed at some standard price.

However, client purchasing Infrastructure as a Service from Cloud Computing provider can encounter problems when deploying applications on this infrastructure, which are supplied by third vendors. Not all of the software vendors offer licenses suitable for a cloud. Most fitted licenses for cloud usage are those based on concurrent user's model where software is licensed per simultaneous connections. Oracle, for example, has a list of authorized cloud environments (with Amazon's Elastic Computer Cloud among them) and instructions how to count these licenses.[174] Amazon Web Services Service Terms also explicitly state that for example use of Red Hat software is subject to the terms and conditions of their own Subscription Agreement.[175]

While client purchasing Cloud Computing services in a public cloud does not have to worry about licenses for the infrastructure itself, license to deploy and run certain software is under his sole responsibility. As can be seen from above, traditional license models are not well suited for Cloud Computing and may substantially limit client's options. Taking into account growing interest in Cloud Computing, software vendors failing to adopt appropriate schemes can lose customers to other vendors. On the other hand, same inappropriate license terms can hold an organization back from adopting Cloud Computing.[176]

---

[172] Ibid, pp. 396-400.
[173] AWS Customer Agreement, Amazon 2015. aws.amazon.com/agreement/ (26 September 2015).
[174] Licensing Oracle Software in the Cloud Computing Environment. www.oracle.com/us/corporate/pricing/cloud-licensing-070579.pdf (26 September 2015).
[175] AWS Service Terms, Amazon 2015. aws.amazon.com/service-terms/ (26 September 2015).
[176] McRoberts (2013), *supra* nota 171, p. 396.

Although there are some innovative solutions out there, as for example Amazon's DevPay service, that lets its clients which are using Amazon cloud to deliver their own software, to manage access and billing for their service, clients using such public cloud to host third-party software are usually on their own to negotiate it with those third parties and ensure compliance.

While, as was mentioned above, concurrent user licenses is the best fit for a cloud out of traditionally established types, it is up to software vendor to decide whether to modify license accordingly. Some scholars call to establish a range of standard license models that would be suitable for Cloud Computing that software vendors could choose from, because it would make more sense to delegate license management and billing to service providers instead.[177] Another suggestion is to work on standard Application Program Interfaces (APIs) for cloud providers to make license management automated and give software vendors possibility to track transparency of service provider's service.[178]

2.4.2. IP rights ownership

Another aspect of IP that is relevant in the context of IT Outsourcing and Cloud Computing is the ownership of IP rights. IT Outsourcing contracts would usually stipulate who owns the data to be placed into the system and any subsequent modifications of it. While in our case outsourcer will own the data that is uploaded into the systems hosted on Outsourcing service provider servers, modifications have to be mentioned separately. If outsourcer is outsourcing some IP rights, he has to make sure that service provider has necessary rights and license to use it, so there are no restrictions affecting outsourcer ability to effectively perform his obligations.[179]

As IP attributed to outsourcer can be further modified or enhanced, and parties can also jointly create some IP, it is also necessary to establish who will have ownership over this new data.[180] Joint ownership is in general not the best option in a case of agreement's termination since neither of parties would be able to exploit their rights without permission from the other party, so such cases have to be discussed and agreed in advance.

[177] Ibid, p. 401.
[178] Ibid.
[179] Ghelfi, D. The 'Outsourcing Offshore' Conundrum: An Intellectual Property Perspective. WIPO, www.wipo.int/export/sites/www/sme/en/documents/pdf/outsourcing.pdf (26 September 2015) p. 10.
[180] Ibid.

In our IT Outsourcing case examples of newly created IP in the course of service provider delivering service would be writing a customized script to be used on outsourcer's server. The outsourcer will probably like to own that kind of IP or acquire a license for it. Or for example, customized configuration, let it be web-server. Not only would outsourcer like to own right in it, but maybe even prevent service provider of reusing configuration for other clients or keep it a business secret. It is wise to stipulate in an agreement what is considered trade secret and requires corresponding treatment as the service provider may engage subcontractors if agreement permits it. Dealing with this type of questions at the stage of entering into an agreement can save a lot of work and time for negotiations later on. Also, in IT Outsourcing deals outsourcer can request a possibility to audit service provider and ensure that he is fulfilling these obligations.

In the case of Cloud Computing, the picture becomes less clear in case client is renting Cloud Computing resources in a public cloud, where there will be no extensive negotiations with a service provider on the abovementioned points. Although in the process of uploading, storing and processing of data, Cloud Computing provider may create new IP, it may be difficult to separate it from the client's existing content and thus establish ownership over such IP rights.[181] Taking a look at Oracle's and Amazon's Terms of Services, there is no clauses stipulating ownership of IP rights other than ones saying that you own rights in what you upload. Nor does they mentions other IP that may result from the use of Cloud Computing service. And of course, agreements do not authorize the client to conduct an audit to assess Cloud Computing service provider compliance.

Oracle Cloud Service Agreement, however, stipulates that Oracle may compile statistical and other data about clients use of service, use it for statistical analyses and research and development and could even make it publicly available (in a form that does not reveal clients content or confidential information). It also explicitly states that such analysis does not constitute personal data, and all intellectual property rights remain with Oracle.[182]

Amazon's Web Services Customer Agreement, in turn, contains clauses which determine that content client posts or submits to various forums, sample code repositories, etc. is governed by the

[181] Intellectual property in the cloud. Allen & Overy, 2013. www.allenovery.com/SiteCollectionDocuments/Intellectual_property_in_the_cloud_May_2013.PDF (26 September 2015) p. 4.
[182] Oracle Cloud Service Agreement, 2015. www.oracle.com/us/corporate/contracts/cloud-csa-fi-en-2351279.pdf (26 September 2015). p.9.

terms of the Apache Software License, unless specified otherwise.[183] Apache license gives others "perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form"[184].

2.4.3. Conclusions

Taking into account abovementioned conclusions can be drown that in the field of IP Cloud Computing services complicate the picture for business users. It is relevant both to license matters and also ownership of IP rights over the data stored or produced in a cloud. While licensing on the level of infrastructure can become easier for a client as it can be purchased as a service, deploying third party application on top of it can be problematic because of the license terms of third party's licenses. Largest Cloud Computing providers have somehow adapted license terms to allow an application to be run in a cloud, but only in limited authorized environments, which means that they restrict clients in their choice of Cloud Computing providers. To make compliance easier some standard schemes for licensing in a cloud are suggested by scholars along with standardized APIs.

When it comes to IP ownership, unlike IT Outsourcing where parties have a possibility to address all of the possible scenarios in an agreement and determine ownership or necessary licensing terms, relations between client and Cloud Computing service provider are usually not as tight as Outsourcing one, if we consider a public cloud. Answers to multiple questions remain blurry as service agreements are usually silent on these matters. While they acknowledge client's rights in uploaded data, which may well be driven by the intent to qualify as an intermediary service provider, a vast variety of more complicated questions remains unanswered.

2.5. Contracts and Service Level Agreements in Cloud Computing and IT Outsourcing

Although many fields of law directly influence both IT Outsourcing and Cloud Computing services, contract remains the main instrument regulating relations between providers and clients, expressing their free will and intent to be bound by certain obligations. In certain cases, it is, of course,

[183] AWS Customer Agreement, Amazon 2015. aws.amazon.com/agreement/ (26 September 2015).
[184] Apache License, Version 2.0, January 2004. www.apache.org/licenses/LICENSE-2.0 (26 September 2015).

arguable whether both parties possess the same bargaining power and whether roles allocated to each of them by the contract are in line with the relevant regulatory provisions.[185]

A contract is an important tool in the relationship between outsourcer and service provider as it defines functions to be performed, usually in a long run, and anticipates greater intimacy than relationship created in other commercial contexts.[186] Its most important function is to match expectations,[187] thus extensive negotiations between parties are crucial to fulfill the objective. Negotiating a contract can be time-consuming, but when it is done properly it can prevent future disputes and ensure that each party's interest is taken into account in the event of disagreement.

2.5.1. IT Outsourcing and Cloud Computing contracts distinctive features

Just like any other specific types of contracts, outsourcing ones have their distinctive features, which will be summarized and compared to distinctive characters of Cloud Computing. Contracts are generally considered to be low-risk if they cover standalone systems, potentially even those already observed by outsourcer in the past, but as soon as they include a certain link between equipment, software or systems in general, they become much more complex. Some argue that service providers no longer supply services on the basis of fitness for purpose and prefer to sell them by description, thus not warranting that supplied services will meet the outsourcer purpose.[188] This author supports this view to a certain extent, it will usually be the case for those supplying separate services, but there are certainly cases where the purpose of a contract is integration between systems and services, where service provider would eventually need to give some warranties in order to conclude a contract.

Another aspect in this context is that service provider would usually not guarantee that hardware and software work well together as a system and treat them as separate services.[189] It may well be a case, so outsourcer has to be well aware of contract provisions. It could happen that sales people from service provider side state that their service will match outsourcer need, but the same will not be guaranteed in the contract and thus will be unenforceable, especially in a case where such a

[185] As in data protection context, where roles of processor and controller are determined on the basis of parties relation to the data in question.
[186] Kavaleff, (2006), *supra* nota 4, p. 222.
[187] Boyle, R. Outsourcing and IT Contracts. International Yearbook of Law, Computers and Technology 1993, 7. p. 129.
[188] Ibid.
[189] Ibid, p. 131.

contract contains entire agreement clause, meaning that last version of it is the only legally binding document for the parties.

As it was mentioned in previous subchapters, IT Outsourcing comprises a lot of different services which can vary dramatically. Although there is a variety of Cloud Computing services, to match clients' need service provider separates its services from each other (e.g. infrastructure components, platform, etc.). Despite providing certain guarantees for compatibility between its own services, Cloud Computing providers do not guarantee compatibility with client's own systems. To ensure proper system integration client would need to figure it out on its own or use an external party to provide such type of consultancy (external party could even be a traditional Outsourcing provider). This applies of course to the case of a public cloud and usually can be negotiated in a private one.

Apart from the fact that Cloud Computing contracts for public clouds are concluded on a take it or leave it basis, there are few aspects that they usually do not cover, unlike Outsourcing ones. First of all, subcontracting may be restricted by Outsourcing agreement, while in Cloud Computing it is not. Moreover, it is assumed by clients that service provider utilizes services provided by external providers. Because of the standardized nature of the service provided no test procedures are available for Cloud Computing while they are often included in Outsourcing agreements with a purpose of ensuring a corresponding quality of service before delivery acceptance. Standardization of Cloud Computing contracts and relations, in general, results into the absence of particular contact person for each client and no obligations to get client's approval for substituting certain employees.

Reporting is something that can be offered by Cloud Computing contract, but it often takes a form of a dashboard rather than personalized contacts with a client. It also does not anticipate audit possibilities, whereas Outsourcing agreement would usually include such arrangements. Data hostage terms, which allow Outsourcing provider to hold data hostage until outsourcer performs a certain obligation (e.g. payment), is a great concern in IT Outsourcing context.[190] In Cloud Computing, this threat takes a form of data portability question, possibility to extract data in a widely-used format which allows the data to be quickly and efficiently imported into another cloud.[191]

[190] Carpenter (2010), *supra* nota 167, p. 4.
[191] It was elaborated on in competition law subchapter.

Another issue for businesses purchasing Cloud Computing services in a public cloud are changes into the Terms and Conditions. Unlike Outsourcing agreements, where terms are changed on the basis of a mutual agreement, in a public cloud such changes occur even without client being aware of it. The study has been conducted on the topic of Terms and Conditions of 31 different services (not only IaaS, but also PaaS and SaaS) offered by 27 cloud providers. It showed that in half a year 18 documents from 11 providers where changed and change was notified (revision date was stated), 28 documents from 18 providers were unchanged and notified (last revision date included), 19 documents from 12 providers were unchanged and not notified (no revision date, thus impossible to track a change unless one compares text) and, finally, 4 documents from 3 providers were changed but not notified.[192] Consequently, business users of a public cloud risk missing an important update to Terms and Conditions that may potentially cause non-compliance.

2.5.2. Service Level Agreements

Service Level Agreement is an important part of a contract (often takes a form of an annex), which describes in detail service to be delivered, sets provider and client expectations, identifies metrics by which effectiveness of contracted services will be measured, changed and controlled.[193] It specifies "objective, quantifiable, repeatable measures of matters within the service provider's responsibility, such as the performance of systems, the resolution of incidents or service requests, or the volume and accuracy of transactions and other outputs"[194]. Starting point for such measurements can be existing operation parameters or industry standards, where SLAs are adjusted based on the future expectation of service and technology improvement.

According to De Silva *et al* (2005), companies were measuring and reporting performance to their internal customers long before Outsourcing and practice then spread to Outsourcing arrangements.[195] It became a tool for establishing expected performance characteristics for a service that provider and client can rely on.[196] An advantage of keeping SLAs in a separate document or as

[192] Bradshaw *et al.* Contracts for clouds: comparison and analysis of the Terms and Conditions of cloud computing services. International Journal of Law and Information Technology 2011, 19(3). p. 215-216.
[193] Goo, J. Structure of service level agreements (SLA) in IT outsourcing: The construct and its measurement. Information Systems Frontiers 2010, 12. p.186.
[194] De Silva *et al*. Outsourcing Contracts: Lessons Learned. Commonwealth Law Bulletin 2005, 31(2). p. 7.
[195] Ibid.
[196] Frey *et al.* Key Performance Indicators for Cloud Computing SLAs. The Fifth International Conference on Emerging Network Intelligence, EMERGING 2013, p.61.

an annex to the main agreement is a possibility to revise it quickly and conveniently and modify measurements accordingly.

Well-defined SLA benefit both client and service provider as it prevents misunderstanding between parties strengthens trust and induces service improvement. When negotiating SLAs clients would usually prefer as detailed as possible description with a wide variety of measurements to be performed, while service provider favors general indications to ease future compliance with those obligations. However, studies show that "as the number of performance metrics increase, satisfactory outcomes decrease"[197]. It further finds that performance improvement must be balanced with the inclusion of additional metrics and that client has to find a balance between directly measurable goals and those less measurable, otherwise the performance of individual objective may suffer.[198]

There are different views on what exactly specifications should be included into SLA, one of them being eleven elements described by Goo (2010), which include service level objectives, service level contents, process ownership, future demand management, anticipated change, innovation, feedback, communication, measurement, conflict arbitration and enforcement.[199] Studies suggest that typical Cloud Computing concerns in SLA can be mapped to match those elements.[200]

The main difference between IT Outsourcing and Cloud Computing SLA is the way they are established. Public cloud SLA is a standard one, managed unilaterally by service provider, where client simply has to accept described characteristics. The client has no active role in the process other than agreeing to the SLA.[201] Giving the nature of relations between a client and a provider, IT Outsourcing SLA is closer to SLA in a private cloud, where decision are taken bilaterally. Two traditional IT Outsourcing SLA elements are redundant for the public cloud – innovation plan and anticipated change plan, while one remaining partially redundant is the exit strategy. It is in sole control of service provider what changes will be made to improve the service, which is not a clear cut for still maturing Cloud Computing services.[202]

---

[197] Fitoussi et al. IT Outsourcing Contracts and Performance Measurement. Information Systems Research 2012, 23(1), p. ii.
[198] Ibid, p. 30-32.
[199] Goo (2010), *supra* nota 193, p. 185-205.
[200] Comuzzi *et al.* Clearing the Sky - Understanding SLA Elements in Cloud Computing. Beta Working Paper series 412, 2013. cms.ieis.tue.nl/Beta/Files/WorkingPapers/wp_412.pdf .p. 8-9.
[201] Ibid, p. 11.
[202] Ibid, p. 12.

Other primary differences between SLA for IT Outsourcing and Cloud Computing are no service level objectives in regard to a cloud (as SLA is constructed unilaterally, without acknowledging client's needs), governance aspects (e.g. expectations from a client) and absence of change management, which is controlled by a service provider.[203] On the basis of this observation Comuzzi *et al.* (2013) created Cloud Outsourcing Framework that can be used for making Outsourcing decisions, where they argue that once Cloud Computing is chosen as Outsourcing option, certain aspects of SLA are more critical than others, as for example privacy or authorization could be more critical than negotiating performance-related aspects.[204]

Typical Cloud Computing SLAs can provide service guarantees, such as availability, response time, disaster recovery, problem resolution time, allocation and releasing resources. Those are guaranteed over a specific time period, where the smaller is the time, the higher are commitments. An important aspect of those service guarantees is their granularity – whether availability is calculated per service, instance or aggregated. Specific exclusion to guarantees can be introduced, as, for example, in regard to maintenance. Way to report and measure violation, type of service credits[205] have to be addressed by SLA.[206]

The burden of detecting SLA violations usually lies on the customer and it can be unacceptable for an enterprise.[207] Not only is it necessary for client to monitor cloud service, but also to report any violations in time, as most providers accept these claims only during a certain period of time after violation occurred (usually up to one month). Review of different Cloud Computing providers' SLAs have been completed in 2012 and it showed that they only address availability, while enterprises need much more guarantees, such as disaster recovery, privacy, auditability, and security.[208]

Currently, Amazon EC2 (IaaS) Service Level Agreement promises reasonable efforts to make EC2 available with monthly uptime of at least 99.95% (month being monthly billing cycle) and offers service credits if it does not comply with the commitments, except in the event of maintenance or other *force majeure.* Uptime percentage is calculated based on Availability Zone, which means that

[203] Ibid, p. 13.
[204] Ibid, p. 18.
[205] Service credits can be used instead of fine payment for breaching SLA. They are usually utilized to obtain a discount for future services.
[206] Baset, S. A. Cloud SLA: Present and Future. CM SIGOPS Operating Systems Review 2012, 46(2). p. 57-58.
[207] Ibid, p. 63.
[208] Ibid, p. 64.

the whole region has to be unavailable, not single instances or volumes, so all of the client's running instances have to lose external connectivity. Service credit is a dollar credit calculated on the uptime percentage and can be used only for future payments in the same availability region. To receive a credit, client has to submit a claim in accordance with a sample form including logs supporting the claimed outage before the end of the second billing cycle when the incident occurred.[209] As apparent, EC2 SLA is really basic and addresses only question of availability and remuneration for a breach. Availability is further restricted to regions and burden of proof for its unavailability lies with a client.

Oracle Service Description for Compute Cloud Service (which corresponds to EC2 IaaS) promises commercially reasonable efforts to maintain availability rate of 99.95% during a month. Unavailability means all of the instances having no external connections. It also provides definitions for other aspects of system functioning that can be chosen from upon entering into an agreement (outbound data transfer, block storage capacity, IO requests).[210] Public Cloud Hosting and Delivery Policies, supplementing abovementioned document provides also that Oracle provides reasonable security measures to protect service environment, while the client remains solely responsible for operating, maintaining and securing operating systems and other software. It also precludes transferring private key necessary for accessing environment except to those performing work on client's behalf. Target system availability can be relied upon only in case client complies with the terms of the ordering document and recommendations. The policy excludes planned outages and maintenance, unavailability of management or administration services and utilities, outages due to denial of service attack, *force majeure*, regulatory actions, any failures resulting from customer's interaction with service (configurations, testing, scripts) and reasons outside of Oracle's control.[211]

2.5.3. Conclusions

As we see, contract plays an important role in IT Outsourcing context, but usually fails to secure client's interest in Cloud Computing deals. Contract and SLA being unilateral in public clouds force clients to accept the terms that not necessarily reflect their need. At the same time, certain aspects

[209] Amazon EC2 Service Level Agreement, 2013. aws.amazon.com/ec2/sla/ (26 September 2015).
[210] Oracle Platform as a Service and Infrastructure as a Service – Public Cloud Service Descriptions - Metered & Non-Metered, 2015. www.oracle.com/us/corporate/contracts/paas-iaas-public-cloud-2140609.pdf (26 September 2015). p. 35-36.
[211] Oracle Platform and Infrastructure Services – Public Cloud Hosting and Delivery Policies, 2014. www.oracle.com/us/corporate/contracts/cloud-platform-inf-hosting-delivery-2206160.pdf (26 September 2015).

of IT Outsourcing SLA are not equally important in the context of a public cloud, so a balance has to be maintained between different objectives, because, as it was mentioned, having it all is not a strategy producing the best results. Two different SLAs for IaaS have been revised and they revealed similar target service levels and even the same percentage of promised uptime, although ways to calculate it differ. Both addressed availability and one of providers has even addressed some security aspects. One can speculate that its due to the fact that provider is traditional software development company that has even been engaging in Outsourcing, although one would expect much detailed SLA in that case. Thus, SLAs in a public cloud may not be an optimal tool for regulating provider-client relations, there might be a need in other instruments that could create incentives for businesses to adopt cloud more widely, such as industry standards and guidelines, which will be partially addressed in the next chapter.

3. Cloud Computing and Digital Single Market

In May 2015, the European Commission presented Digital Single Market Strategy[212] in an attempt to harmonize regulations and build a coherent single market in the digital dimension. The policy is based on the three pillars: better access for consumers to online goods and services across Europe, establishment of the right conditions for digital networks and services, maximization of the growth potential of the European Digital Economy. Cloud Computing has been mentioned as one of the focus areas in the context of the last pillar, as cloud technologies along with the big data are predicted to boost EU's competitiveness[213] and become a catalyst for economic growth.[214]

The Strategy has been developed in the course of the agenda[215] of the new European Commission lead by Jean-Claude Juncker, which sets Connected Digital Single Market as priority number two. Overall goal to be achieved is defined as "to ensure that consumers can access services… on their electronic devices wherever they are in Europe and regardless of borders… create a fair level playing field where all companies offering their goods or services in the European Union are subject to the same data protection and consumer rules, regardless of where their server is based"[216].

It is not the first time Cloud Computing makes it to the EU political agenda, there were quite a few initiatives in this field, starting with a study in 2010 of the opportunities for European Cloud Computing,[217] which set out a list of recommendations for the European Commission in order to ensure EU benefiting from new technologies. Among other things, proposed actions included stimulation of research and technological development in the area of Cloud Computing, setting up a regulatory framework, promoting European leadership position in software development through relevant open source approaches and encouraging development and production of Cloud

[212] A Digital Single Market Strategy for Europe. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. 6.5.2015, COM(2015) 192. eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0192 (26 September 2015).
[213] Ibid, p. 4.
[214] Ibid, p. 14.
[215] A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change. Political Guidelines for the next European Commission, 2014. www.eesc.europa.eu/resources/docs/jean-claude-juncker---political-guidelines.pdf (26 September 2015).
[216] Ibid, p. 6.
[217] The Future of Cloud Computing. Opportunities for European Cloud Computing Beyond 2010. Expert Group Report, ERCIM and SAP Research, 2010. cordis.europa.eu/fp7/ict/ssai/docs/cloud-report-final.pdf (26 September 2015).

interoperation standards.[218] Various actions have been undertaken by the Commission, some of which will be summarized below.

Horizon 2020 is an EU programme promoting research and innovation that lists particular fields for researches to cover. The Work programme for 2014-2015[219] included research on advanced cloud infrastructure and services, different data management models, lowering energy demand of cloud solutions and developing methods and tools for high performance that would strengthen the competitive position of the European industry. The programme for 2016-2017[220] aims to address revolution in cloud architecture, networking, deployment, security and privacy needs of customers. The goal is to "increase the uptake of cloud technology by providing the robustness, trustworthiness, and performance required for applications currently considered too critical to be deployed on existing clouds"[221]. The programme also aims to foster competitive, innovative and reliable cloud computing for small and medium enterprises (SMEs) and public institutions, which is believed to benefit Digital Single Market, providing an interconnected and decentralised cloud.

3.1. European Cloud Computing Strategy

In 2012 the Commission adopted the first comprehensive document covering Cloud Computing strategy, Unleashing the Potential of Cloud Computing in Europe[222]. Strategy acknowledged Cloud Computing potential to lower IT-related expenses, enable development of new services and make services more attractive and efficient while stressed on the need of timely approach what will enable its faster adoption. Primary points to address were fragmentation of the single market, unfair contract clauses, and weak or non-existent standards, which altogether may prevent businesses and especially SMEs from adopting Cloud Computing. The overall aim of the strategy is to enable

[218] Ibid, p. 3-4.
[219] Horizon 2020 Work Programme 2014 – 2015, 5. Leadership in enabling and industrial technologies, i. Information and Communication Technologies, 2013. ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-leit-ict_en.pdf (26 September 2015).
[220] Horizon 2020 Work Programme 2016 – 2017, 5. Leadership in enabling and industrial technologies, i. Information and Communication Technologies, 2015. ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-leit-ict_en.pdf (16 November 2015).
[221] Ibid, p.19.
[222] Unleashing the Potential of Cloud Computing in Europe. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 27.9.2012, COM(2012) 529. eur-ex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0529:FIN:EN:PDF (26 September 2015).

public cloud meeting European standards in regulatory terms while being competitive, open and secure.[223] The Commission has been positive about a potential progress and stated that outlined set of actions "will lay the foundation for Europe to become a world cloud computing powerhouse"[224] and also provide a basis for a rapid growth of public clouds.

The document also elaborated on Cloud Computing in the context of abovementioned Digital Single Market Strategy, which is expected to bring single market to a new level. According to the study conducted on behalf of the Commission and referred to in the strategy, public cloud has potential to generate around €250 billion in GDP in 2020 if necessary changes are implemented or only €88 billion if no changes will occur, and would further generate 3,8 million extra jobs.[225] Some legislative issues have been highlighted in the document, including cross-platform licensing, notice and take-down procedures for illegal content, common standards for e-authentication and data protection.

Strategy sets out concrete actions to be implemented, first of them is creation of standards that promote competition and trust, being voluntary certification scheme and possibly tackling environmental concerns (energy and water consumption etc.).[226] Safe and fair contracts is the second action that stresses upon a differences between IT Outsourcing and Cloud Computing contracts, where "the greater flexibility of cloud computing as compared to traditional outsourcing is often counterbalanced by reduced certainty for the customer due to insufficiently specific and balanced contracts with cloud providers"[227]. In order to ensure safe and fair contract provisions, the Commission proposed development of the model terms for Cloud Computing SLA and code of conduct.

Thirdly, the Commission has established European Cloud Partnership to promote public sector innovation and set stringent requirements for performance, security and compliance for cloud solutions. Although certain EU Member States already had their own national initiatives, fragmentation of the market had to be avoided, as "pooling public requirements could bring higher efficiency and common sectoral requirements (e.g. eHealth, social care, assisted living, and

[223] Ibid, p. 6.
[224] Communication from the Commission, *supra* nota 212, p. 16.
[225] Quantitative Estimates of the Demand for Cloud Computing in Europe and the Likely Barriers to Take-up. IDC, 2012. ec.europa.eu/newsroom/dae/document.cfm?doc_id=1115 (26 September 2015). p. 9.
[226] Ibid, p. 10-11.
[227] Ibid, p. 11.

eGovernment services such as open data) would reduce costs and enable interoperability"[228]. Key actions to achieve the objective were creation of IT procurement for a cloud, joint procurement of public cloud by public bodies and their coordination.

The European Cloud Partnership Steering Board has been established as a part of the Cloud Computing Strategy, which comprises of IT and telecom actors, government representatives. In 2014, the Board presented a policy vision document[229] on the establishment of Trusted Cloud Europe, a framework for defining and applying non-legislative best practices to Cloud Computing to market participants based on their voluntary adherence. The Steering Board has also requested the Commission to assist in setting up and executing initiatives to reach a consensus on application of such best practices.[230]

3.2. Standardization of Cloud Computing

Upon a request from the European Commission European Telecommunications Standards Institute (ETSI) started the Cloud Standards Coordination initiative and delivered few reports in accordance to it. The first report was published in 2013[231], it contained an analysis of the existing standards in the field and defined necessary new standards. The key reason for creating standards according to the report lies in the fact that they bring more confidence to investors and customers while at the same time do not disrupt innovation as some overly invasive methods.[232]

The study stresses upon the fact that Cloud Computing is not a new technology and there are already quite a few standards that may be applied, which nevertheless are not cloud specific. According to the report, "Cloud Standards landscape is large but not chaotic and by no means a 'jungle'"[233]. However, specific cloud standards are not widely adopted by service providers as they may not be flexible enough to match providers' unique offers. Certain progress is already made in the

[228] Ibid, p. 13.
[229] Establishing a Trusted Cloud Europe. A policy vision document by the Steering Board of the European Cloud Partnership, 2014. ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=4935 (26 September 2015).
[230] Ibid, p.21.
[231] Cloud Standards Coordination. ETSI Final Report, 2013. csc.etsi.org/resources/CSC-Deliverable-008-Final_Report-V1_0.pdf (26 September 2015).
[232] Ibid, p. 28.
[233] Ibid, p. 28.

interoperability area, such as standardization of APIs, IaaS models and also to some extent in cloud vocabulary. Areas of improvement include incident management, forensics, accountability management and SLAs. The latter constitutes a major concern as it anticipates agreed definitions of service level objectives and associated metrics.

Subsequent reports have been delivered in 2015, the first one is on Cloud Computing User Needs[234], summarizing results of a conducted survey, which showed that security, integrity, and data privacy were the topics users cared most about. The main concern as seen by ETSI is market participants' unawareness of already existing and potential future standards and requires substantial marketing efforts. Cloud Computing Standards and Open Source report[235] considers open source to be potentially important vector of innovation in the field, complementing existing standards. ETSI calls for collaboration between standardization organizations and open source projects in joint projects, however, it is stressed that only standards provide stability and neutrality necessary to avoid a lock-in.

Report on Interoperability and Security in Cloud Computing[236] used particular case scenarios to list associated issues, such as moving data between service providers, retrieving data in case of service provider's failure, security in a hybrid cloud, SLAs in multi service providers' environment etc. Finally, Cloud Computing Standards Maturity Assessment[237] analyzed existing standards that might be applied to Cloud Computing at different stages of service delivery (set-up of services, preparation and procurement, operating and usage of service, assuring its quality) and identified gaps to be addressed. Among critical gaps were standardization of evaluation reports, monitoring of processing and networking performance, availability, incident management, responding to SLAs infringements, negotiations between multiple providers and resolving disputes.

[234] Cloud Computing Users Needs. Analysis, conclusions and recommendations from a public survey, ETSI, 2015. csc.etsi.org/resources/STF_486_WP1_Report-v2.0.0.pdf (16 November 2015).
[235] Cloud Computing Standards and Open Source. Optimizing the relationship between standards and Open Source in Cloud, ETSI, 2015. csc.etsi.org/resources/STF_486_WP2_Report-v2.0.0.pdf (16 November 2015).
Computing
[236] Interoperability and Security in Cloud Computing. ETSI, 2015. csc.etsi.org/resources/STF_486_WP3_Report-v2.0.0.pdf (16 November 2015).
[237] Cloud Computing Standards Maturity Assessment. A new snapshot of Cloud Computing Standards, ETSI, 2015. csc.etsi.org/resources/STF_486_WP4_Report-v2.0.0.pdf (16 November 2015).

3.2.1. Cloud Computing SLA Standardisation

Cloud Service Level Agreement Standardization Guidelines[238] have been adopted in 2014 pursuant to the second key action of the Cloud Computing Strategy and cover B2B business relations (between service providers and customers not being consumers). It will serve as a basis for further actions and contribute to the development of relevant ISO standards. Guidelines provide basic principles that are to be borne in mind when drafting SLAs, e.g. technology neutrality, business model neutrality, worldwide applicability, unambiguousness of definitions, comparability of service level objectives, specifying information rather than structure, etc.

The document starts with defining the relevant concepts, such as Cloud Computing, infrastructure, data and metrics and proceeds to describing performance metrics for different service level objectives and their properties, e.g. availability, response time, capacity, capability, support, and reversibility. Besides performance objectives, Guidelines also address security (authentication and authorization, cryptography, logging, auditing, governance), data management (mirroring and backup, portability), personal data protection (codes of conduct, certification, purpose, retention and disclosure, transparency, accountability, geographical location) aspects.

Another recently adopted document in this field is the final report by the European Commission on Standards terms and performance criteria in service level agreements for cloud computing services[239], objective of which was to study and summarize existing rules in respect to SLAs in the EU Member States and to create Model SLA which could be used by cloud service providers. The study showed that it is not common to have cloud-specific legislation in place, especially one covering SLA aspects. Various SLAs of certain national and international service providers were analyzed and results showed that global providers usually offer standard, non-negotiable SLAs, whereas smaller national providers may allow the customer to negotiate them. Usually SLAs address availability and exclusion of liability in some way, either measurable or abstract and although most of the Member States do not have standard models, there are some voluntary guidelines for service providers' disposal.

[238] Cloud Service Level Agreement Standardisation Guidelines, 2014. ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?action=display&doc_id=6138 (26 September 2015).
[239] Standards terms and performance criteria in service level agreements for cloud computing services. Final Report, time.lex and Spark Ltd, 2015. ec.europa.eu/newsroom/dae/document.cfm?doc_id=10860 (16 November 2015).

The Model SLA developed in the report is not a stand-alone contract, but cloud-oriented set of aspects to be addressed in SLAs, comprising only measurable and technology neutral metrics. It targets B2B contracts but may also benefit B2C ones. Model addresses change management, breach of SLAs and some service level objectives (availability, support, capacity). By no means is it comprehensive, but aims to complement existing guidelines and contribute to ongoing projects, providing some insights into the cloud framework in the different Member States, which are encouraged to revise and develop them further.

3.2.2. Cloud Computing Code of Conduct

Data Protection Code of Conduct for Cloud Computing is under development while its first draft was presented in early 2015[240] and later reviewed by Article 129 Working Party. According to the draft Code of Conduct is a voluntary instrument for cloud service provider to demonstrate its compliance with the Code requirements, either by self-evaluation or by a third-party audit. A service provider may choose to adhere to the Code completely or partially but has to inform customers about it. The Code is designed for service providers acting solely as data processors, but those that are also the controllers may adhere as well. Among other things, the Code imposes an obligation to contractually ensure data protection compliance, ask for a consent for transferring data within a group and abroad, provide their customers with a right to audit, define liability and setup data subject compliant handling procedure, specify security framework that is used and its objectives, apply recommended security measures and sets up governance bodies.

Article 29 Working Party adopted an opinion on the draft Code of Conduct[241], which suggested quite a few updates to the Code. First of all, it has to be adapted to the Proposed Data Protection Regulation and transition management strategy has to be developed. Adherence to the Code should not mean that service providers are no longer obliged to monitor changes into legislation and adapt to those changes. Party suggests complementing the Code with an obligation to provide information on the location of data processing which is taking place and also asks to clarify the notion of personal data, to extend liability adherence and prevent Terms and Services favoring service provider. Different

[240] Data Protection Code of Conduct for Cloud Service Providers. ec.europa.eu/newsroom/dae/document.cfm?doc_id=11194 (16 November 2015).
[241] Opinion 02/2015 on C-SIG Code of Conduct on Cloud Computing. Article 29 Working Party, 2588/15/EN WP 232, 2015. www.coco-cloud.eu/sites/default/files/cococloud/files/content-files/articles/WP29%20opinion%20on%20CSIG%20code%20of%20conduct_en.pdf (16 November 2015).

security levels have to be worked out based on the data type and right to audit has to be broader. Thus, the Code has to be revised to reflect on the criticism.

3.3. Conclusions

A substantial amount of initiatives has been taken by the European Commission in the recent years in an attempt to promote Cloud Computing adoption and harmonize the common market. It indicates an intent to address the legal uncertainties associated with cloud solutions and secure EU's leading position in technology in general. The Cloud Computing Strategy adopted in 2012 have been partially fulfilled by recently established Cloud SLA Standardization Guidelines and Data Protection Code of Conduct for Cloud Service Providers, nevertheless cloud made it to the new Digital Market Strategy and is included into the yearly Horizon 2020 programmes.

While the focus of the Commission has been largely on standardization, mainly in SLA and fair contract terms, legal issues have yet to be addressed. Although Data Protection Code of Conduct aimed to bring cloud service provider in line with the regulations, it has been rightly criticized by Article 29 Working Party as failing to take into account potential forthcoming changes into the legislative framework. Rather than looking into the nature of the existing contradictions in applying current regulations to Cloud Computing, there are attempts to force the existing framework by providing general guidelines which are not always justified in the context of balancing parties' interests. However, Digital Single Market Strategy lists regulatory framework as one of the areas to address, so there might be some changes coming in 2016, when the Commission intent to present proposals covering i.e. data ownership, free movement of data.

Conclusions

This thesis aimed to examine Cloud Computing in the context of different areas of law while comparing it with a wider concept of IT Outsourcing. It started with an assessment of different Outsourcing definitions and choosing a working definition for the purpose of this research. One of the existing definitions has been modified to correspond to the current circumstances and to fit this particular research. Thus, for the purpose of this work Outsourcing is a business practice of transferring business activities of the outsourcer to a third provider without being linked by any kind of subordination. Consequently, IT Outsourcing is an abovementioned practice of transferring IT-related activities.

The development of IT Outsourcing and competition between service providers led to optimization of resources and development of technologies that enabled more efficient resource distribution and lowered IT operation costs. Some of those technologies became a basis for Cloud Computing, which is not a new technology itself, but rather a new way of delivering services incorporating recent developments. The terms was introduced in 2006 in the marketing context and a decade later is more popular than ever, although there is no commonly used definition of it.

Cloud Computing is used to describe a variety of services provided online, which can be considered as a set based on the common characteristics of services than on the underlying technologies and business models. The basic characteristics are providing services online mainly through the web interface while hosting application on remote infrastructure, but there are of course dozens of other ones. Although both Cloud Computing and IT Outsourcing have been subject to extensive research, studies of the latter one are human-centered focusing on the management of business relations while former is usually studied from the technology-centered perspective and different implementation scenarios.

Different opinions exist on how IT Outsourcing and Cloud Computing relate to each other, with some seeing latter as an evolution of IT Outsourcing and some considering it as a completely different concept. The author argues that despite the fact that Cloud Computing opens new possibilities of carrying out certain IT functions more efficiently, it nevertheless does not differ from IT Outsourcing and supports the view that Cloud Computing is as tool for enabling IT Outsourcing,

characterized by delivering IT resources as services over the Internet while providing a service with certain characteristics.

Consequently, Cloud Computing cannot be seen as a defined type of service, because of the variety of definitions offered by scholars and market participants, but rather as service meeting certain criteria. As to IT Outsourcing, Cloud Computing can be seen as a model of providing IT Outsourcing services, as traditional Outsourcing providers offer them to the same (or new) customers. Moreover, there are no significant differences between these concepts in terms of private cloud, apart from few aspects. Public cloud raises far more questions in the light of IT Outsourcing and it became a subject to more extensive analysis under this research.

Particular areas of law were assessed in the light of two example cases. For Cloud Computing, it has been undertaking purchasing IaaS service in a public cloud, using which it is processing the data of its external customers. For IT Outsourcing the case is outsourcer purchasing from external service provider provision of infrastructure and middleware with service provider owning hardware, which may not be installed in the same jurisdiction.

As for IT Outsourcing and Cloud Computing under the GATS, they, in general, cause the same questions. The first is no definition of service and unclear differentiation between goods and services. While Cloud Computing would generally be regarded as a service (although electronic delivery of software could possibly question it), IT Outsourcing could potentially also constitute trade in goods if hardware supply would be included. Modes of Supply and categories covering particular services are considered to be the same (with neither of services being covered by a single sector). Cloud Computing lacks any direct commitments for the time being, but recent interest in a dialogue on Cloud Computing under GATS leaves a hope of eventual resolution of these uncertainties, which would also contribute IT Outsourcing field in general, since it is obviously too broad to be tackled at once.

Data protection is a widely discussed topic in the context of Cloud Computing, and there are certainly grounds for that. While current legislation in this area can usually be effectively applied to IT Outsourcing deals, it is rarely the case for Cloud Computing. One of the major concerns is processor-controller obligations and holding each other liable. While Outsourcing contracts anticipates a certain level of integration between parties and long and lasting business partnership, Cloud Computing solutions are not tailored to a specific client (unless it is a private cloud) and

contracts are usually standard ones, favoring service provider. Applying data protection regulations to Cloud Computing by analogy with IT Outsourcing is not feasible because of different business relations which make the same allocation of roles unjustified, different aims of contracts (lasting partnership vs short-term provisioning of resources) and the fact that in such circumstances outsourcer would rather cooperate with traditional IT Outsourcing provider for provisioning of a private cloud rather than with external provider for obtaining public cloud solutions, which causes a competition concern.

The Proposed General Data Protection Regulation does not provide much clearness into the picture, although it addresses few additional concerns, such as interoperability and portability. The scope of the Regulation has been modified to reach certain Cloud Computing providers, however, it failed to address service provider in the example case of B2B cloud provisioning. Also, the proposed Regulation follows the logic of Data Protection Directive, the feasibility of which has been questioned by multiple scholars.

When it comes to the information security objectives in IT domain, confidentiality, integrity and availability, existing legislation focus mostly on the first of the objectives by imposing restrictions on processing and transferring personal data, holding data processors and controllers liable. Availability has to some extent been addressed in the Proposed Data Protection Regulation, however, it aims to ensure data availability to data subjects, which in the example case does not really make a difference as personal data is processed not by data subject but by a business entity on behalf of the data subject.

On the other hand, integrity seems not to be addressed at all. While confidentiality aspect has been over-addressed meaning also that it minimizes the risks of unauthorized parties modifying the data, it makes sense to specifically address this aspect. Obligations of interoperability and portability are resource-demanding, but addressing integrity aspect could be as simple as implementing logging function tracking all the modifications. Thus, a substantial review of data protection law has to be made to provide more effective and feasible framework, also acknowledging other aspects, such a competition law and IP rights protection.

As to Competition law, apart from generally challenging community dimension and market share aspects, the areas that require extra attention are different for IT Outsourcing and Cloud

Computing. First of all, a question that arises is applicability of *ex post* competition regulations. While for IT Outsourcing challenging subject appears to be regulations of mergers, when such a deal includes a transfer of employees or some other assets (i.e. IP), for Cloud Computing market definition is something that would cause discussions. Because of the variety of services being name as a cloud, one may not rely on the commercial naming, but should assess the substance of the service itself.

The first distinctive feature of Cloud Computing in this context is that service provider may abuse its dominant position because of interoperability and portability concerns. Although abuse is something that has to be proved, this concern rarely if at all exists in IT Outsourcing deal, because of the nature of relationship and quality of a contract. The second one is a dependence of Cloud Computing services on external ISP, which can result both in abuse of dominant position by ISP or anticompetitive agreements between ISPs and Cloud Computing service providers.

The second question is the efficiency of these *ex post* regulations in promoting competition and balancing interests of market participants. According to the studies, none of cloud service provider is close to the substantial market share yet, thus abovementioned scenarios will probably not become a subject for the Commission investigation in the near future. It also means that there might be a need for addressing competition concerns in other fields of law. The subject of Cloud Computing under the Competition law is rather new, with few studies conducted on it, but safeguarding competition in this area is widely discussed in the context of other fields of law, which suggests that there is a need for introducing relevant *ex ante* provisions to effectively address competition concerns.

IP is something that is often mentioned in relation to Cloud Computing, nevertheless it is usually about copyright infringement and difficulty of tracing and seizing the material. Although it of course is important for businesses providing copyrighted context, in the case examined in this work licensing and ownership of IP created in cloud environment is what matters more. Saving costs on software licenses is usually not the primary aim of IT Outsourcing or Cloud Computing deal, but paying too little attention to it may cause substantial fines or lost opportunities. While Cloud Computing surely has a potential of simplifying licensing, for now it only complicates it. Pooling of resources and short-term allocation is not normally foreseen and it prevents clients from managing license assets effectively. Although on the infrastructure level cloud may ease the compliance by providing license as a service, deploying third party application on top of it can be problematic because of the license terms of third party's licenses.

On the other hand, there is IP ownership, something that can be effectively addressed by IT Outsourcing contract, but not in a public cloud one. While ownership of IP uploaded into the cloud is usually guaranteed by a service provider, which may well be driven by an intent to qualify as an intermediary service provider, other IP created in the environment may not be the client's property, and a vast variety of more complicated questions remain unaddressed by contract terms.

Different fields of law directly influence both IT Outsourcing and Cloud Computing services, but contract remains the main instrument to regulate relations between providers and clients as they express their free will and intent to be bound by certain obligations. Besides the fact that Cloud Computing contracts in public clouds are concluded on a take it or leave it basis, few other distinctions from IT Outsourcing ones can be drawn. These are the absence of restrictions on subcontracting, absence of pre-acceptance test procedures and necessity of obtaining approval for substituting certain employees, along with unilateral and not always communicated changes into the Terms and Conditions.

When it comes to the SLA, an important part of every IT-related contract, the way SLA is established (unilaterally) influence the guarantees provided by it. Two traditional IT Outsourcing elements are redundant for public cloud, innovation plan, and anticipated change plan while exit strategy is partially redundant. Other distinctive characters are the absence of service level objectives for cloud itself, not including governance aspects and burden of detecting and reporting SLA violations lying on the customer and not service provider. At the same time, certain aspects of IT Outsourcing SLA are not equally important in the context of public cloud, so a balance has to be maintained between different objectives because having it all is not a strategy producing the best results. Thus, SLAs in a public cloud may not be an optimal tool for regulating provider-client relations, there might be a need for other instruments that could create incentives for businesses to adopt cloud more widely, such as industry standards and guidelines.

Although quite a few initiatives have already been taken in the EU to promote Cloud Computing adoption and straighten EU's competitiveness and some of the abovementioned issues have been addressed in one way or another, they do not yet achieve their ultimate aim of creating incentives for business clients to adopt public cloud. Voluntary SLA Standardization guidelines and Code of Conduct can serve a purpose informing market participants of the relevant issues in this field, but do not really create that certainty for business clients to choose public cloud over the private one

or over other available options. Nevertheless, Cloud Computing is now a part of broader Digital Single Market Strategy that would hopefully assess necessary actions in this area from the wider perspective.

Final words

This author aimed to show the need for a wider approach to Cloud Computing and interdependency of all the different aspects that come into the picture when businesses choose a public cloud. There is certainly a need for a bigger picture, seeing Cloud Computing in the context of a variety of other IT Outsourcing services that can be chosen between. Promoting cloud adoption will be most efficient if seen from the perspective of potential clients making a decision on the suitable option, which would be based not only on technology considerations but also compliance and contract enforcement matters. Comparing particular IT Outsourcing cases with Cloud Computing ones is a good starting point to taking a comprehensive approach to address obstacles to wider cloud adoption. Further research would benefit from extensive studies on competition concerns in the field and its dependence on the other fields.

List of Sources

Books and Articles

1. Barthélemy, J. The Hidden Costs of IT Outsourcing. MIT Sloan Management Review, 2001, 42(3), pp. 60-69.
2. Baset, S. A. Cloud SLA: Present and Future. CM SIGOPS Operating Systems Review 2012, 46(2), pp. 57-66.
3. Bednarzik, R.W., Restructuring information technology: is offshoring a concern? Monthly Labor Review 2005, 128, pp. 11-21.
4. Berry, R., Reismann, M. Policy Challenges of Cross-Border Cloud Computing. Journal of International Commerce and Economics 2012, 4(2), pp. 1-38.
5. Boyle, R. Outsourcing and IT Contracts. International Yearbook of Law, Computers and Technology 1993, 7, pp. 121-143.
6. Bradshaw, S., Millard, C., Walden, I. Contracts for clouds: comparison and analysis of the Terms and Conditions of cloud computing services. International Journal of Law and Information Technology 2011, 19(3), p. 215-216.
7. Carpenter, R. H. Walking from Cloud to Cloud: The Portability Issues in Cloud Computing. Washington Journal of Law, Technology and Arts 2010, 6(1), pp. 1- 14.
8. Carr, N. G. The End of Corporate Computing. MIT Sloan Management Review, 2005, 46(3), pp. 66-73.
9. De Silva, S., Golding, P. Outsourcing Contracts: Lessons Learned. Commonwealth Law Bulletin 2005, 31(2), pp. 3-51.
10. Determannt, L. What happens in the Cloud: Software as a Service and Copyrights. Berkley Technology Law Journal 2014, 29, pp. 1095-1130.
11. Field, T. Kodaks' 1989 outsourcing deal shifted the way CIOs looked at their work. And the changes aren't over yet. CIO 1999, 13(1), pp. 73-80.
12. Fitoussi, D., Gurbaxani, V. IT Outsourcing Contracts and Performance Measurement. Information Systems Research 2012, 23(1), pp. 129-143.
13. Goo, J. Structure of service level agreements (SLA) in IT outsourcing: The construct and its measurement. Information Systems Frontiers 2010, 12, pp. 185-205.

14. Gupta, N., Chauhan, B., Anand, T., Dewan, C. Cloud Computing: Comparison with Previous Technique and Research Challenges. International Journal of Computer Applications, 2014, 85(8), pp. 43-47.

15. Gupta, U.G., Gupta, A. Outsourcing the IS function: is it necessary for your organization? Information Systems Management 1992, pp. 44-50.

16. Gutirrez, H., E. Peering Through the Cloud: The Future of Intellectual Property and Computing. The Federal Circuit Bar Journal 2011, 20, pp. 589-607.

17. Hert, P. D., Papakonstantinou, V. The proposed data protection Regulation replacing Directive 95/46/EC: A sound system for the protection of individuals. Computer Law & Security Review 2012, 28(2), pp. 130-142.

18. Hoover, J., N. Compliance in the Ether: Cloud Computing, Data Security and Business Regulation. Journal of Business and Technology Law 2013, 8(1), pp. 255-274.

19. Hon, K., Millard, C., Walden, I. The problem of "personal data" in cloud computing: what information is regulated? – the cloud of unknowing. International Data Privacy Law, 2011, 1(4), pp. 211-228.

20. Hon, K., Millard, C., Walden, I. Who is responsible for "personal data" in cloud computing? - The cloud of unknowing, Part 2. International Data Privacy Law, 2012, 2(1), pp. 3-18.

21. Johnston, J.L. Outsourcing: New Name for an Old Practice. Law Library Journal 1996, 88(1), pp. 128-134.

22. Lynn, J. Let Somebody Else Do It! Commercial law Bulletin 2002, 17, pp. 19-23.

23. Katzan, H. Jr., Cloud Software Service: Concepts, Technology, Economics. Service Science, 2009, 1(4), pp. 256-269.

24. Kavaleff ,A.Successful Outsourcing through Proactive Contracting - Strategy, Risk Assessment and Implementation. Scandinavian Studies in Law 2006, 49, pp. 215-226.

25. Kertesz, A., Varadi, S. Legal aspects of data protection in cloud federations. Security, Privacy and Trust in Cloud Systems, Springer, Berlin, 2014, pp. 433-455.

26. Lapid, K. Outsourcing and Offshoring Under the General Agreement on Trade in Services. Journal of World Trade 2006, 40(2), pp. 341-364.

27. Loh, L., Venkatraman, N. Diffusion of Information Technology Outsourcing Influence Sources and the Kodak Effect, Information Systems Research 1992, 3(4), pp. 334-358.

28. Lohrberg, J., Huhtamäki, M. Outsourcing Transactions and Merger Control. European Competition Law Review, 2008, 6, pp. 349-355.

29. Luciano, L., C., Walden, I. Ensuring competition in the Clouds: The role of competition law? ERA Forum 2011, 12(2), pp. 265-285.

30. MacDonald, D., Streatfield, M. Personal Data Privacy and the WTO. Houston Journal of International Law 2014, 36(3), pp. 625-653.

31. Mantelero, A. Cloud computing, trans-border data flows and the European Directive 95/46/EC: applicable law and task distribution. European Journal for Law and Technology, 2012, 3(2).

32. Markota, S. Cloud Computing from EU Competition law perspective. Student economic law review, 2013, 2, pp. 32-37.

33. Martson, S., Li,, Z., Bandyopadhay, S., Zhang, J., Ghalsasi, A. Cloud computing - The business perspective". Decision Support Systems, 2011, 51, pp. 176-189.

34. Mattoo, A., Wunsh, S. Preempting Protectionism in Services: The GATS and Outsourcing. Journal of International Economic Law 2014, 7(4), pp. 765-800.

35. McGillivray, K. Conflicts in the Cloud: Contracts and Compliance with Data Protection Law in the EU. Tulane Journal of Technology and Intellectual Property, 2014, 17, pp. 217- 253.

36. McRoberts, M. Software Licensing in the Cloud Age, The International Journal of Soft Computing and Software Engineering 2013, 3(3), pp. 395-402.

37. Picker, R., C. Competition and Privacy in Web 2.0 and the Cloud. Northwestern University Law Review Colloquy 2008, 103(1), pp. 1-12.

38. Rashbaum, K., N., Borden, B., Beaumont , T. Outrun the Lions: A Practical Framework for Analysis of Legal Issues in the Evolution of Cloud Computing. Ave Maria Law Review 2014, 12(1), pp. 71-102.

39. Rohmann, C., A., Cuhna, J., F., S., R. Some Legal Aspects of Cloud Computing Contracts. Journal of International Commercial Law and Technology 2015, 10, pp. 37-45.

40. Sauve, P. Assessing the General Agreement on Trade in Services: Half-Full or Half-Empty? Journal of World Trade, 1996, 29(4), pp. 125-145.

41. Schultz, C. W., To Offshore or not to Offshore: Which Nations Will Win a Disproportionate Share of the Economic Value Generated from the Globalization of White-collar Jobs? Houston Journal of International Law 2006-2007, 29 (1), pp. 231-269.
42. Sluijs, J, Larouche, P, Sauter, W. Cloud Computing in the EU Policy Sphere Interoperability, Vertical Integration and the Internal Market. Journal of Intellectual Property, Information Technology and E-Commerce Law 2012, 4(1), pp. 12-32.
43. Smith, S., L. Abidor and House: Lost Opportunities to Sync the Border Search Doctrine with Today's Technology. New England Criminal and Civil Confinement 2014, 40, pp. 223-245.
44. Stitilis, D., Malinauskaite I. Compliance with basic data protection principles in cloud computing: the aspect of contractual relations with end-users. European Journal of Law and Technology 2014, 5(1).
45. Svantesson, D. J. The Extraterritorialy of EU Data Privacy Law – Its Theoretical Justification and Its Practical Effect on U.S. Businessses. Stanford Journal of International Law 2014, 50(1), pp. 53-102.
46. Swire, P., Lagos, Y. Why the Right to Data Portability Likely Reduces Consumer Welfare: Antitrust and Privacy Critique. Maryland Law Review, 2013, 72(2), pp. 335-380.
47. Taylor, T. In defense of outsourcing. Cato Journal 2005, 25, pp. 367-377.
48. Weiss, R. M., Azaran, A. Outward Bound: Considering the Business and Legal Implications of International Outsourcing. Georgetown Journal of International Law 2007, 38, pp. 735-753.
49. Weber, R. H., Burri, M. Classification of Services in the Digital Economy. Springer, Zürich, 2012, p. 144.
50. Wu, T. The World Trade Law of Censorship and Internet Filtering. Chicago Journal of International Law 2006, 7(1), pp. 262-287.
51. Yigitbasioglu, O., Mackenzie, K., Low, R. Cloud Computing: How does it differ from IT outsourcing and what are the implications for practice and research? The International Journal of Digital Accounting Research 2013, 13, pp. 99-121.
52. Zallonet, R. Here, There and Everywhere: Mobility Data in the EU (Help needed: Where is Privacy?) Santa Clara High Tech Law Journal 2014, 30, pp. 57-88.

Research papers

53. Allweyer, T., Besthorn, T., Schaaf, J. IT outsourcing: between starvation diet and nouvelle cuisine. Deutsche Bank Research, 2004, 43.
54. Amant K. St. IT Outsourcing: Concepts, Methodologies, Tools, and Applications. New York, Business Science Reference 2009, p. 2511.
55. Armbrust, M., Rabkin, A., Stoica, I., Zaharia, M. Above the Clouds: A Berkeley View of Cloud Computing. Technical report, EECS Department, University of California at Berkeley, 2009. www.eecs.berkeley.edu/Pubs/TechRpts/2009/EECS-2009-28.html (26 September 2015).
56. Botta, M. EU Competition Law and its Relevance for the Technology Industry. Institute for European Integration Research, Austrian Academy of Science, 2011. techlaw.univie.ac.at/fileadmin/user_upload/inst_unternehmensrecht/Wahlfachkorb_Technologierecht/WS_11/Botta.pdf (26 September 2015).
57. Cloud Readiness Index 2014, Asia Cloud Computing Association's. www.asiacloudcomputing.org/images/research/ACCA_CRI2014_ForWeb.pdf (26 September 2015).
58. Comuzzi, J., Grefen, P. Clearing the Sky - Understanding SLA Elements in Cloud Computing. Beta Working Paper series 412, 2013. cms.ieis.tue.nl/Beta/Files/WorkingPapers/wp_412.pdf .
59. Di Sant'Orsola, F. C., Noormohamed, R., Guimarães, D., A. Communications and Competition Law, Key Issues in the Telecoms, Media and Technology. International Bar Association, 2015. p. 423.
60. Frey, S., Luthje, C., Reich, C. Key Performance Indicators for Cloud Computing SLAs. The Fifth International Conference on Emerging Network Intelligence, EMERGING 2013, pp. 60-64.
61. Gonzales et al. Outsourcing: Past, present and Future. IT and Public Policy, 2014. courses.cs.washington.edu/courses/csep590/04au/clearedprojects/Dorwin.pdf (26 September 2015).
62. Edlund, Å. Cloud Computing. Challenges and Opportunities for Swedish Entrepreneurs. Näringspolitiskt forum Rapport #5. Entreprenörskapsforum, 2012.

entreprenorskapsforum.se/wp-content/uploads/2012/11/N%C3%A4Po_Cloud_Webb.pdf (26 September 2015).

63. Hindley, B., Lee-Makiyama, H. Protectionism Online: Internet Censorship and International Trade Law. ECIPE Working Paper 2009, 12/2009.
64. Hon, K., Hörnle, J., Millard, C. Data Protection Jurisdiction and Cloud Computing – When are Cloud Users and Providers Subject to EU Data Protection Law? Legal Studies Research Paper No 84/2011, Queen Mary University of London. ssrn.com/abstract=1924240 (26 September 2015).
65. Hon, K., Kosta, E., Millard, C., Stefanatou, D. White paper on the proposed data protection regulation, Cloud Accountability Project, WP25, 2014. www.a4cloud.eu/sites/default/files/D25.1%20White%20paper%20on%20new%20Data%20Protection%20Framework.pdf (26 September 2015).
66. Cloud Standards Coordination. ETSI Final Report, 2013. csc.etsi.org/resources/CSC-Deliverable-008-Final_Report-V1_0.pdf (26 September 2015).
67. Cloud Computing Standards and Open Source. Optimizing the relationship between standards and Open Source in Cloud, ETSI, 2015. csc.etsi.org/resources/STF_486_WP2_Report-v2.0.0.pdf (16 November 2015).
68. Cloud Computing Standards Maturity Assessment. A new snapshot of Cloud Computing Standards, ETSI, 2015. csc.etsi.org/resources/STF_486_WP4_Report-v2.0.0.pdf (16 November 2015).
69. Cloud Computing Users Needs. Analysis, conclusions and recommendations from a public survey, ETSI, 2015. csc.etsi.org/resources/STF_486_WP1_Report-v2.0.0.pdf (16 November 2015).
70. Computing Interoperability and Security in Cloud Computing. ETSI, 2015. csc.etsi.org/resources/STF_486_WP3_Report-v2.0.0.pdf (16 November 2015).
71. KPMG's The Cloud: Changing the Business Ecosystem, 2011. www.kpmg.com/IN/en/IssuesAndInsights/ThoughtLeadership/The_Cloud_Changing_the_Business_Ecosystem.pdf (26 September 2015).
72. Leimeister, S., Böhm, M., Riedl, C., Krcmar, H. The Business Perspective of Cloud Computing: Actors, Roles and Value Networks. ECIS 2010 Proceedings. home.in.tum.de/~riedlc/res/LeimeisterEtAl2010-preprint.pdf (26 September 2015).

73. Mattoo, A., Subramanian, A. India and the Multilateral Trading System after Seattle: Toward a Proactive Role. The World Bank, Policy Research Working Paper 2379, 2000.
74. Quantitative Estimates of the Demand for Cloud Computing in Europe and the Likely Barriers to Take-up. IDC, 2012. ec.europa.eu/newsroom/dae/document.cfm?doc_id=1115 (26 September 2015).
75. Schellekens, B.J.A. The European Data Protection Reform in the light of Cloud Computing (Master's thesis). Tilburg University, 2013. njb.nl/Uploads/2014/4/Master-thesis-Bart-Schellekens.pdf (26 September 2015.
76. Standards terms and performance criteria in service level agreements for cloud computing services. Final Report, time.lex and Spark Ltd, 2015. ec.europa.eu/newsroom/dae/document.cfm?doc_id=10860 (16 November 2015).
77. The Future of Cloud Computing. Opportunities for European Cloud Computing Beyond 2010. Expert Group Report, ERCIM and SAP Research, 2010. cordis.europa.eu/fp7/ict/ssai/docs/cloud-report-final.pdf (26 September 2015).
78. The future of IT outsourcing and cloud computing A PwC study, 2011.
79. www.pwcaccelerator.com/pwcsaccelerator/docs/future-it-outsourcing-cloud-computing.pdf (26 September 2015).
80. Wang, W., Laszewski, G. Scientific Cloud Computing: Early Definition and Experience. 10th IEEE International Conference on HPCC, 2008, pp. 825-830.
81. Weinert et al. The Evolution of IT Outsourcing: From its Origins to Current and Future Trends. University of Wuppertal Working paper no. 202, 2005.
82. Willcocks, L., Lacity, A., Cullen, S. Information Technology Sourcing: Fifteen Years of Learning. Working Paper. Department of Information Systems, London School of Economics and Political Science 2006. www.lse.ac.uk/management/documents/research/is-working-papers/ISIG-WP-144.PDF (26 September 2015).
83. World Trade Organization, Negotiating Group on Basic Telecommunications, Reference Paper, 1996. Telecommunications services. www.wto.org/english/tratop_e/serv_e/telecom_e/telecom_e.htm (26 September 2015).
84. Youseff, L., Butrico, M., Da Silva, D. Toward a Unified Ontology of Cloud Computing. Grid Computing Environments Workshop, 2008, pp. 1-10.

Treaties and Conventions

85. Annex on Telecommunications. General Agreement on Trade in Services, 15 April 1994. The Results of the Uruguay Round of Multilateral Trade Negotiations, The Legal Texts (1994), 325, 33 ILM, 1167. pp. 313-316.
86. CoE, Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, Council of Europe, CETS No. 108, 1981.
87. Consolidated Version of the Treaty on European Union OJ C 326, 26.10.2012.
88. General Agreement on Tariffs and Trade 1994, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, The legal texts: The Results of the Uruguay Round of Multilateral Trade Negotiations 17 (1999), 1867 U.N.T.S. 187, 33 I.L.M. 1153 (1994).
89. General Agreement on Trade in Services, 15 April 1994. The Results of the Uruguay Round of Multilateral Trade Negotiations, The Legal Texts (1994), 325, 33 ILM, 1167.

Legal acts and case law

90. Charter of Fundamental Rights of the European Union, OJ 2012 No. 326, 26.10.2012.
91. CJEU 6.10.2015, C-362/14, *Schrems v Data Protection Commissioner.*
92. Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market, OJ 2000, No.178, 17.07.2000.
93. Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, OJ 1995, No. 281, 23.11.1995.
94. Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the EC Merger Regulation) OJ L 24, 29.1.2004.
95. Regulation (EC) No 316/2014 of 21 March 2014 on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of technology transfer agreements, OL J 93, 28.03.2014.
96. Regulation (EC) No 460/2004 of the European Parliament and of the Council of 10 March

2004 establishing the European Network and Information Security Agency, OJ 2004, Vol. 37, 13.3.2004.

European Commission

97. A Digital Single Market Strategy for Europe. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. 6.5.2015, COM(2015) 192. eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0192 (26 September 2015).
98. A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change. Political Guidelines for the next European Commission, 2014. www.eesc.europa.eu/resources/docs/jean-claude-juncker---political-guidelines.pdf (26 September 2015).
99. Cloud Service Level Agreement Standardisation Guidelines, 2014. ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?action=display&doc_id=6138 (26 September 2015).
100. Commission Decision of 26 July 2000 pursuant to Directive 95/46/EC of the European Parliament and of the Council on the adequacy of the protection provided by the safe harbour privacy principles and related frequently asked questions issued by the US Department of Commerce 2000/520/EC, OJ L 215, 25.08.2000.
101. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Unleashing the Potential of Cloud Computing in Europe, 27.9.2012, COM(2012) 529. eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0529:FIN:EN:PDF (26 September 2015).
102. Data Protection Code of Conduct for Cloud Service Providers. ec.europa.eu/newsroom/dae/document.cfm?doc_id=11194 (16 November 2015).
103. Horizon 2020 Work Programme 2014 – 2015, 5. Leadership in enabling and industrial technologies, i. Information and Communication Technologies, 2013. ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-leit-ict_en.pdf (26 September 2015).

104. Horizon 2020 Work Programme 2016 – 2017, 5. Leadership in enabling and industrial technologies, i. Information and Communication Technologies, 2015. ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-leit-ict_en.pdf (16 November 2015).

105. Proposal for a Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation), COM 2012 (011) final eur-lex.europa.eu/legal-ontent/EN/TXT/PDF/?uri=CELEX:52012PC0010&from=en (26 September 2015).

106. Unleashing the Potential of Cloud Computing in Europe. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 27.9.2012, COM(2012) 529. eur-ex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0529:FIN:EN:PDF (26 September 2015).

Standards

107. ISO/IEC. 27000:2014 Information technology - Security techniques - Information security management systems - Overview and vocabulary. International Organization for Standardization, Geneva, Switzerland.

108. ISO/IEC. 27001:2013 Information technology -- Security techniques -- Information security management systems – Requirements. International Organization for Standardization, Geneva, Switzerland.

109. Kissel, R. Glossary of Key Information Security Terms. National Institute of Standards and Technology, Information Technology Laboratory, 2013. nvlpubs.nist.gov/nistpubs/ir/2013/NIST.IR.7298r2.pdf (26 September 2015).

110. Mell, P., Grance. T. The NIST Definition of Cloud Computing. National Institute of Standards and Technology, Information Technology Laboratory, 2011. csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf (26 September 2015).

111. Three-level IT baseline security system ISKE. www.ria.ee/iske-en (26 September 2015).

Other legal materials

112. Classification in the Telecom Sector under the WTO-GATS Framework. Communication from the European Communities, 2005, TN/S/W/27, S/CSC/W/44.

113. Establishing a Trusted Cloud Europe. A policy vision document by the Steering Board of the European Cloud Partnership, 2014. ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=4935 (26 September 2015).

114. Gounares, A. G., Bergstraesser T. F., Brumme C.W., Cheng, L., Larus, J. R., Johannes, H., Meijer, M., Mishra, D. P., Snyder, I. L. (2006) Data normalization. United States patent US2008082480 A1.

115. Opinion 05/2012 on Cloud Computing. Article 29 Working Party, WP 196, 01037/12/EN, Brussels, 1 July 2012.

116. Opinion 02/2015 on C-SIG Code of Conduct on Cloud Computing. Article 29 Working Party, 2588/15/EN WP 232, 2015. www.coco-cloud.eu/sites/default/files/cococloud/files/content-files/articles/WP29%20opinion%20on%20CSIG%20code%20of%20conduct_en.pdf (16 November 2015).

117. Opinion 1/2010 on the concepts of ‘controller’ and ‘processor’. Article 29 Working Party, WP 169, 00264/10/EN, Brussels, 16 February 2010.

118. Services Sectoral Classification List, World Trade Organization. MTN.GNS/W/120 document of 10 July 1991.

119. The Central Product Classification (CPC): Version 1.1. New York: United Nations, 2004.

120. Work Program on Electronic Commerce: Ensuring that Trade Rules Support Innovative Advances in Computer Applications and platforms, such as Mobile Applications and the Provision of Cloud Computing Services. Communication from the United States, 2011, S/C/W/339.

Other sources

121. Amazon EC2 Service Level Agreement, 2013. aws.amazon.com/ec2/sla/ (26 September 2015).

122. Apache License, Version 2.0, January 2004. www.apache.org/licenses/LICENSE-2.0 (26 September 2015).
123. AWS Customer Agreement, Amazon 2015. aws.amazon.com/agreement/ (26 September 2015).
124. AWS Service Terms, Amazon 2015. aws.amazon.com/service-terms/ (26 September 2015).
125. Bressie, K., Kende, M., Wiliams, H. Telecommunications trade liberalization and the WTO. 15th ITS Biennial Conference Berlin, 2004. www.hwglaw.com/siteFiles/News/69A7C2994A9A82580D112146E5FB0E0C.pdf (26 September 2015).
126. Chow, R., Golle, P., Jakobsson, M., Shi, E., Staddon, J., Masuoka, R., Molina, J. Controlling Data in the Cloud: Outsourcing Computation without Outsourcing Control. ACM Workshop on Cloud Computing Security, 2009, pp. 85-90.
127. Fowler, G. A., Worthen, B. The Internet Industry Is on a Cloud - Whatever That May Mean. The Wall Street Journal 2009. www.wsj.com/articles/SB123802623665542725 (26 September 2015).
128. Ghelfi, D. The 'Outsourcing Offshore' Conundrum: An Intellectual Property Perspective. WIPO, www.wipo.int/export/sites/www/sme/en/documents/pdf/outsourcing.pdf (26 September 2015).
129. Hon, K.The 12 Cs of Cloud Computing: A Culinary Confection. www.scl.org/site.aspx?i=ed26082 (26 September 2015).
130. Intellectual property in the cloud. Allen & Overy, 2013. www.allenovery.com/SiteCollectionDocuments/Intellectual_property_in_the_cloud_May_2013.PDF (26 September 2015).
131. Jardin, C., Cywie, G., Outsourcing: some legal aspects, 2008. www.legal500.com/assets/images/stories/firmdevs/nobl11898/outsourcing_-_some_legal_aspects_september_2008.pdf (26 September 2015).
132. Licensing Oracle Software in the Cloud Computing Environment. www.oracle.com/us/corporate/pricing/cloud-licensing-070579.pdf (26 September 2015).
133. Luoma E. Examining Business Models of Software-as-a-Service Companies. Jyväskylä Studies in Computing, 2013. jyx.jyu.fi/dspace/bitstream/handle/123456789/42663/978-951-

39-5562-5_vaitos19122013.pdf (26 September 2015).

134. Oracle Cloud Service Agreement, 2015. www.oracle.com/us/corporate/contracts/cloud-csa-fi-en-2351279.pdf (26 September 2015).
135. Oracle Platform and Infrastructure Services – Public Cloud Hosting and Delivery Policies, 2014. www.oracle.com/us/corporate/contracts/cloud-platform-inf-hosting-delivery-2206160.pdf
136. Oracle Platform as a Service and Infrastructure as a Service – Public Cloud Service Descriptions - Metered & Non-Metered, 2015. www.oracle.com/us/corporate/contracts/paas-iaas-public-cloud-2140609.pdf (26 September 2015).
137. Oracle Unveils Oracle Enterprise Manager 12c, 2011. www.oracle.com/us/corporate/press/512064 (26 September 2015).
138. Pettey, C., Gartner Says Worldwide IT Outsourcing Market Grew 7.8 Percent in 2011. www.gartner.com/newsroom/id/2021215 (26 September 2015).
139. Tijhus, F. Why License Management in Outsourcing Fails, Crayon. www.crayon.com/globalassets/pdfs/whitepapers/why-license-management-in-outsourcing-fails.pdf (26 September 2015).
140. The risks associated with cloud computing. Analyses et Syntheses. Autorité de contrôle prudential. acpr.banque-france.fr/fileadmin/user_upload/acp/publications/analyses-syntheses/201307-The-risks-associated-with-cloud-computing.pdf (26 September 2015).
141. The top 5 truths behind what the cloud is not. White paper. Citrix Cloud Solutions, 2012. www.citrix.com/content/dam/citrix/en_us/documents/products-solutions/the-top-5-truths-behind-what-the-cloud-is-not.pdf (26 September 2015).