The Cloud Computing: the impact of regulation on adoption

Kamal EL AGUEZ
Information Technologies
Economics and Management
Department
INPT Institute
Rabat, Morocco
elaguez.kamal@gmail.com

Nasr HAJJI
Information Technologies
Economics and Management
Department
INPT Institute
Rabat, Morocco
hajji@inpt.ac.ma

Hafid BARKA
Information Technologies
Economics and Management
Department
INPT Institute
Rabat, Morocco
barka@inpt.ac.ma

Abstract: - The global nature of cloud computing creates many governance problems. Formerly, the regulatory framework governing the data storage and processing was well defined; in general, the national laws of each state. Today, cloud computing has to answer a key question: how to design a multi-jurisdictional framework that will be adopted by all countries planning to use cloud services? Our paper provides an overview of the cloud-computing ecosystem, its essential characteristics, its key players and its different types of services and deployments. It also includes an analysis of the opportunities and risks associated with the adoption and implementation of cloud computing services, as well as attempts to answer the question of adapted regulation to this new type of service. It also makes some recommendations and defines the best suitable practices for a successful adoption and implementation of cloud services.

1 Introduction

In the last few years, the offers of cloud computing knew a remarkable development that attracted both the interest of users and businesses trying to optimize their return on investment by using these new services and applications. The rise of cloud services was a logical continuation of a rapid technological development, that includes the following: "1) reliable, high speed networks, 2) commodity server hardware with open interfaces, 3) open source software (e.g. Linux, Apache, and Hadoop), which has slashed the cost of software for data centers, and 4) adoption of open Web 2.0 standards, which has made development of applications in the cloud much easier and faster" [1].

Cloud computing offers a new business model that enables cost reduction, gain in productivity and performance, which are the essential elements that help businesses to overcome the difficulties related to unfavorable economic conditions. This model requires a radical change in the structure of investments in information systems and IT resources; it consists of a complete outsourcing of IT based businesses to the cloud, which will eliminate heavy costs and jurisdictional internal management related issues. Cloud computing also offers the ability of a quick and easy adaptation of resources to customer's requirements. For one to benefit from successful cloud architecture, it is mandatory to set up an environment of trust and certainty that satisfies some technical, legal and organizational constraints.

The rest of this paper is organized in four parts as follows: the second part serves as a general introduction to the cloud ecosystem, the opportunities that it offers and the risks associated with its adoption. The third part, describes the most relevant axes of cloud regulation. Then the fourth part makes a set of recommendations and best practices for Cloud Computing. Finally, a conclusion shall be made to summarize this paper.

2 Cloud Computing

2.1 General aspects

Cloud computing has been brought to the market in 2006, when the U.S. company of e-commerce Amazon, proposed a range of IT infrastructure services called Amazon Web Services (AWS). AWS offers a set of products and services for hosting online applications and data on the Amazon servers. This strategic choice of the aforementioned

company has a goal to recoup the huge investment in infrastructure by renting computing resources and storage of their servers. Moreover, the economic crisis has played a key role in the launch of Cloud Computing offers. The choice of a remote hosting allows considerable savings since the company is freed from the heavy costs of deployment and exploitation of applications, platforms and infrastructures.

In a sluggish economy, cloud computing seems to be the most appropriate solution to meet the needs of companies in terms of reducing costs and improving productivity and performance. Before the advent of Cloud technologies, companies were using traditional applications whose deployment, implementation and maintenance require a high cost and a definite level of expertise. Cloud Computing allows excluding this type of difficulties since the companies are no more concerned with hardware or software management. Other responsibilities such as resource allocation and system upgrades are also delegated to the cloud service supplier who performs then remotely and efficiently.

The emergence of cloud computing is made possible thanks to the democratization of broadband telecommunications networks and the surge of storage capacity. It appeared to suggest the exploitation of storage spaces and computing power offered by a supplier to the customers who need it. The proposed solution is based on a remote architecture where operation and maintenance are provided by a supplier. The client computer accesses, anytime and anywhere, to the resources hosted on a remote server in the cloud, via a Web browser. The client no longer manages its servers. The architecture used is considered as a development of the client-server model; it is named Client-Cloud to explain its mode of functioning.

Nevertheless, Cloud computing is still an immature paradigm with no clearly identified scope, and a considerable diversity of offers, making it difficult to science community to agree on a unified definition of this new concept. In general, it means all services enabling the transfer of data processing and storage from local servers to remote servers in the cloud. It is another dimension of outsourcing.

The National Institute for Standards and Technology (NIST) published in 2011 a final version of its own Cloud Computing definition [2]:

"Cloud computing is 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."

For the NIST, the Cloud Computing model is composed of five essential characteristics, three service models, and four deployments.

Essential characteristics	Service models	Deployments
On-demand self-service;	SaaS (Software as a Service);	Private Cloud
Broad network access;	PaaS (Platform as a Service)	Community Cloud
Ressource pooling;		Public Cloud
Rapid elasticity;	IaaS (Infrastructure as a Service)	Hybrid Cloud
Measured service		

Table 1: The model of Cloud Computing according to NIST

The NIST definition has been widely adopted by the majority of organizations working on the concept of cloud computing, such as the Cloud Security Alliance or the European Network and Information Security Agency (ENISA). The International Telecommunication Union (ITU) has also taken the same definition, specifying the various players in the Cloud ecosystem. They are generally divided into three categories [3]:

- Cloud service user (CSU): the consumers of delivered cloud services; it can be a person or an organization. The intermediate users, that will deliver cloud services provided by a cloud service provider (CSP) to actual users of the cloud service (end users: persons, machines, or applications.), are also included.
- Cloud service provider (CSP): an organization that provides and maintains delivered cloud services.
- Cloud service partner (CSN): the support providers to the building of the service offer of a cloud service provider (e.g. service integration).

There are also definitions proposed by researchers, which are intended to be neutral as those suggested by professors from Queen Mary University of London [4]: "

- Cloud computing provides flexible, location-independent access to computing resources that are quickly and seamlessly allocated or released in response to demand.
- Services (especially infrastructure) are abstracted and typically virtualized, generally being allocated from a pool shared as a fungible resource with other customers.
- Charging, where present, is commonly on an access basis, often in proportion to the resources used."

These definitions are trying to highlight the different characteristics of cloud computing which can be summarized in the following points:

- A distributed architecture where exchanges are performed by remote, centralized servers ;
- Resources are rented and priced according to usage ;
- The resources and computing capabilities are scalable and easily expandable ;
- The resources are dynamically allocated and available anywhere and anytime.

Generally, cloud computing offers a multitude of benefits revolutionizing the concept of IT organization. It allows a particularly powerful and free access computing, open and immediate access to remote and shared resources with the ability to monitor the consumption, as well as a quick and an easy upgrading.

2.2 Cloud Computing: opportunities

Cloud computing is a revolutionary concept of traditional computing whose strengths are indisputable. With its architectural offer of services and its model of operation, it allows removing a number of constraints on the use of current computer systems. Cloud computing services are deployed simply and quickly in response to customer requirements in desired time and quality.

Cloud computing is supported by large companies that hope a return on investment in the near future [5], as it is the case for the public sector. Its benefits are numerous: infrastructure sharing, thus reducing the cost of IT services [6], lightness and scalability

of the cloud structure with constant updates and an acceptable fault tolerance. Moreover, the cloud provides the simplicity of deployment, technological independence and positive effects on the environment. Cloud computing also presents itself as the only opportunity for developing countries, with adequate Internet infrastructure, to access advanced technologies until now reserved for the developed countries.

In 2012, The Focus Group on Cloud Computing at the International Telecommunication Union published a report [7] on the benefits of cloud computing, from different perspectives of the players in the ecosystem of cloud: service providers, partners and users (see Table 2).

The new ecosystem of cloud computing can be seen as an enabling environment for the emergence of new business models and skills that can create an economic value added through the introduction of cloud systems in the various fields of activities [8]. It will inevitably give birth to a consulting market whose main function is helping with the adoption of these new services. Cloud computing, for example, may change the way health care services are available and provide new ways to strengthen research in the same field [9]. It offers: 1) limitless flexibility, 2) better reliability and security, 3) enhanced collaboration, 4) portability, and 5) simpler devices [10].

Generally the benefits of cloud computing can be summarized in the following points:

- A scalable and flexible service that enables fast adaptation to changing storage requirements and bandwidth. It offers the possibility to eliminate the problems associated with the non-estimate of the accurate computing capacity for the service provisioned;
- An economic service through the sharing of infrastructure and a use-oriented billing model;
- An environment, friendly service, reducing energy consumption and the use of water for cooling the servers without forgetting its effect in reducing the emission of harmful gases to the environment;
- A value added carrier service and a creator of opportunities for growth and productivity.

In relation to this last point, it is very interesting to note the role that cloud computing can play in the revival of telecommunications operator's activities

since they are well positioned to make offers in the segment of IaaS. Operators experiencing a drastic decline in their turnover, due to strong competition in the mobile segment, must integrate cloud computing in their future strategies to capture a share of the profits of this new growth opportunity. The Asia Cloud Computing Association (ACCA) published a list of ten factors that determine whether a country is ready for supply and consumption of cloud services [11]:

- **Data privacy** (the cloud relies on a confident and secure flow of data across providers, networks and borders);
- **International connectivity** (international submarine fiber systems, cable systems and capacity upgrade activities) ;
- **Data sovereignty** (the laws that govern the security, privacy and disclosure of data) ;
- **Broadband quality** (high-speed broadband access) ;
- **Government regulatory environment and usage** (the use of cloud by governments for their own needs and the incentives they offer to accelerate demand) ;
- **Power grid and green policy** (power and cooling ; the power efforts, commitments and incentives towards promoting environmentally sound energy production and mass-adoption of efficient, cleaner and cost-competitive renewable energy sources);
- **Intellectual property protection** (regulation and legislation that offer a framework by which intellectual property is protected, and violations penalized, pave the way for a healthy, vibrant cloud ecosystem);
- **Business sophistication** (a country's overall business networks and the operations of individual firms. There is a strong correlation between the level of business sophistication and the adoption of cloud services);
- **Data center risk** (the risk profile of a data centre is critical to the success and stability of a cloud service, but is not easily measured. The location and risk profile of a cloud provider's data center should be important factors for enterprises in making their cloud choices);
- **Freedom of information access** (regulatory regimes that promote access to information in a consistent, predictable manner are needed).

from the service providers' perspectives	from partners' perspectives	From users' perspectives
1. Cost saving; 2. Improve total cost of ownership and de-risk ; 3. Highly scalable and flexible infrastructure ; 4. Efficiency and flexibility of resource management 5. Business agility with rapid service deployment ; 6. Reliability of service with high availability ; 7. High support of third-party business ; 8. Energy efficiency ; 9. IT capability ; 10. Unified managed based OSS ; 11. Accelerate service innovation ; 12. Capability aggregation.	**Network provider :** 1. Bringing new business growth; 2. Increasing users' dependence on access, improving the access bandwidth and global access to income ; **Software provider :** 1. Mainstream software providers of solutions are extensions of the existing services, their product line brings new revenue growth ; **Equipment provider :** 1. New hardware upgrades for equipments will increase. This requires equipment providers to strengthen technical reserves and research in the area of cloud computing, and to provide complete systems support to cloud service providers **System integrator :** 1. The need for system integration solutions for cloud service providers will open up new markets for system integrators.	1. Optimized and rapid provisioning ; 2. Access to applications from anywhere and with any device ; 3. Usage-based billing ; 4. Low-cost migration ; 5. Secure important data.

Table 2: Cloud computing benefits from telecommunications and ICT perspectives (Source: ITU)

2.2 Cloud Computing: challenges

The adoption of cloud computing strategy requires accurate answers to a number of questions, pointing out the challenges and risks associated with this new model of IT services. Cloud computing is defined as the highest level of outsourcing; this raises the issue of user's control level over their own information systems. The stakeholders have concerns about issues such as security, performance, migration and integration with internal applications, cost transparency, data location, plus the clarity of the legal and judicial framework governing cloud services.

It is almost clear that the main problem with the use of these new technologies is the security issue. This aspect is the most relevant obstacle to cloud adoption. In the cloud model, data are outsourced to third parties on which users do not have total control. In addition, they do not know exactly their locations, which leave the regulation partially blind-sided. The table below summarizes all the risks associated with the use of cloud computing services and to which the industry of this new model should design appropriate solutions. They are gathered from different viewpoints.

Business	IT department	Users
- Data security and confidentiality; - Regulatory compliance with the cloud model - Definition of responsibilities; - Problems related to the sharing of infrastructure (heterogeneous hosting); - Integration and interoperability.	- Loss of control; - Security, confidentiality, integrity, availability and traceability; - Network Dependence; - Integration of cloud services with internal solutions	- Provide an alternative to working in online mode; - The quality of services.

Table 3: The risks related to Cloud Computing services

The legal issues must not be overlooked. In fact, cloud computing raises questions about the data location, contracts and competition between different service providers. In the first place, the data location determines the jurisdiction to which they are subject. The governments may also endanger data security. Cloud suppliers may be required for reasons of national security or other reasons, to provide access to such data to government agencies without the consent of the customers, which is the case for the United States with its "Patriot Act ". Secondly, Cloud Computing contracts give birth to subcontracting practices in cascade, something that does not allow customers to control the level of reliability of services. Thirdly, the practices of cloud service providers who are trying to enforce customer loyalty. They offer solutions that make portability and the transition from one provider to another nearly impossible, in addition to anti-competitive termination clauses. Finally, since access to data and / or applications is based on network connectivity, the quality of the latter and its availability become crucial to ensure adequate performance.

3 The Cloud computing regulation

While Cloud computing offers are multiplying and some businesses are already engaged in the adoption of this new strategy, the crucial question of the regulation of these services has not yet been exhaustively discussed. It appears that an effective regulatory development, to include Cloud Computing, is inevitable. Certainly, in order to annihilate the inherent confusion in Cloud Computing, governments need to develop a new approach, taking into account context resulting from the use of these new services and its impact on the data and application security. The regulation will have a major role in the clarification of certain deficiencies under a multitude of law sources.

Involved regulations	Practical and legal constraints
- Criminal Law; - Acts of telecommunications; - Personal data protection; - Consumer Protection; - Antitrust law; - Contract Law ...	- Data and applications locations in the cloud; - Infrastructure location; - The determination of responsibilities in cross-border situations; - Interoperability and portability; - Contractual issues; - Customer closure; - Secure network connections ...

Table 4: Constraints and involved regulations in Cloud Computing

For a successful introduction and adoption of cloud computing services, regulation must negate the risks and ensure full transparency by solving all the problems associated with the use of the Cloud.

3.1 Regulatory watch: encourage the Cloud adoption

Cloud computing irrevocably raises the question of the role of the state and its position in the development of the cloud services. Three modes of intervention can be considered: (1) regulatory state (2) economic actor (3) or user [12]. However, in the following, we are only interested on the regulatory state.

The state can play a decisive role in regulating Cloud computing services by developing, effectively, its regulatory and legal watch to better anticipate new governance requirements [13]. It is also very interesting to note its involvement in the creation of laws and the development of essential regulatory approaches to ensure the proper functioning of the cloud market. However, government intervention should not be excessive to not produce the opposite effect of breaking this growth supporting new business.

Knowing the benefits and opportunities created by the cloud computing services in the information and communication technology sector and even in the general economy, several entities in Europe, the U.S. or the Arab countries, began to make their contributions to ensure a successful adoption and implementation of the cloud computing. Europe has developed a digital agenda, including actions identified as a warranty of cloud computing service development: an open access to content, a simple online and cross-border transactions and a strengthening digital confidence. To achieve these objectives, the European Commission has launched three specific actions to Cloud Computing [14]:

(1) Key Action 1: Cutting through the Jungle of Standards

(2) Key Action 2: Safe and Fair Contract Terms and Conditions

(3) Key Action 3: Establishing a European Cloud Partnership to drive innovation and growth from the public sector.

On the same subject, the European Economic and Social Committee (EESC) has published a reference document "SOC / 402" [15] in the form of an opinion, in which it considers that: "The explosive development of new technologies is causing an exponential increase in the amount of on-line data processing which requires a parallel increase in personal data protection if large scale intrusion into personal privacy is to be avoided. The collection, merging and management of data from multiple sources need to be carefully circumscribed". It adds that "nowadays the exchange of information across the globe has become easier and faster…This rapid increase in information flows around the world presents a big challenge for individuals' rights to personal data privacy. Data protection issues, including their cross-border dimension, affect people every day – at work, in dealing with public authorities, when buying goods or services, or when travelling or surfing the internet". The same report established a comprehensive approach to data protection whose main objectives are:
- Strengthening individuals' rights;
- Enhancing the internal market dimension;
- Revising the data protection rules in the area of police and judicial co-operation in criminal matters;
- The global dimension of data protection;
- A stronger institutional arrangement for better enforcement of data protection rules.

Another report [16] of the same Committee, says that "individuals have the right to enjoy effective control over their personal information".

In order to promote economic growth of cloud computing services, the Federal Communications Commission (FCC) believes that the international community must unite on a few basic principles that will help the development and adoption of Cloud Computing services [17]:
- Promoting policies that raise confidence/trust in the Internet
- Promoting policies that encourage the harmonization of international spectrum and communications device approvals; and
- Avoiding unduly restrictive and protectionist regulations that (directly or indirectly) create barriers to market entry.

In Arab countries, the initiative to create a regional cloud platform for local SMEs has already started. It is designed to meet the security and trust concerns at an affordable price. The "Arab Cloud" will allow cooperation between countries in the region to establish a legal and regulatory framework and encourage local content.

3.2 Security issues of Cloud computing

The current offers of cloud computing provide little insurance on respecting the security of data and applications hosted in the cloud. This explains the urgent need to establish a legal framework for the protection of users from unauthorized use of personal data. There are also some major concerns to be addressed such as data location and access rights.

Moreover, since the cloud computing services are mainly based on Internet connectivity, there is a total transfer of vulnerabilities and risks associated with cybercrime and with the unavailability of services; which requires an upgrade of the current regulatory approach, still partial, to take into account the issues raised by the excessive use of the Internet.

Securing the Cloud Computing environment is not just about the confidentiality, integrity and authenticity of data, it also raises concerns about the ownership of information. Indeed, users have the right to recover their data without being altered or truncated regardless of the locations and jurisdictions that govern them. Besides, the service should respect the intellectual property and personal secrets. Several security measures were taken, such as systematic data encryption, which is the most appropriate solution to protect data including those whose location is not known. Regarding the risk of data loss, technical solutions such as data redundancy have been proven efficient in this area.

Generally, to ensure the security of a cloud environment, there are security standards that service providers can use, such as ISO / IEC 27001, which is an international standard of management system for the security of the information, or SAS 70 defining the methods that can be used by the responsible bodies in internal controls and financial audits on companies. Moreover, several cloud actors are making many efforts to resolve the security issues, such as the Cloud Security Alliance, which aims to promote the use of best practices to ensure the security of cloud computing [18]. The ITU, also, formed a group of discussion on Cloud Computing whose main mission is the development of guidelines and best practices necessary for the adoption of the cloud strategy including those relating to the security of this environment.

3.3 Contracts, standardization and cross-border cooperation

Contracts are the most used legal models, in a cloud environment, to define the terms and conditions of the customer / supplier relationship. They determine the respective roles of client and service provider, especially the provisions relating to the security and privacy protection. However, certain contracts (especially those signed with SMEs or individuals) seem unsatisfactory, unsuitable and sometimes they include illegal or inappropriate clauses; which require changes in regulations to ensure transparency and clarity in contracts organizing the cloud computing services.

The cloud computing contracts can be in different formats, but they commonly include the following [19]:

- **Terms of Service** (ToS). This document details the overall relationship between the customer and provider. It usually contains the commercial terms if the service is paid for, and includes legal clauses such as choice of law and disclaimers. If there are other T&C (terms and conditions) documents, it typically incorporates them by reference.
- **Service Level Agreement** (SLA). This document specifies the level of service the provider aims to deliver together with the process for compensating customers if the actual service falls short of that. Accordingly, SLAs are associated only with paid-for services.
- **Acceptable Use Policy** (AUP). This document details the permitted (or in practice, forbidden) uses of the service.
- **Privacy Policy**. This document describes the provider's approach to using and protecting the customer's personal information. Although usually termed a 'Privacy policy' it often incorporates terms specifically relating to data protection.

The principle of self-regulation practiced in the preparation of the cloud contracts reveals basic failures, especially when the customer lacks of bargaining power (SMEs or individuals). Actually, the service provider requires standard contracts without taking into account the specificities of each

client. In this case, the intervention of regulatory authorities is essential to ensure balance in the customer / supplier relationship. They can dictate minimum mandatory requirements in the cloud contracts, such as service quality, availability, performance, intellectual property rights, and data security. The intervention can take many forms [20]:

- The imposition of obligations that providers are required to address in any cloud contractual process or agreement;
- Certain terms and conditions may be statutorily implied into any agreement, or
- The development of cloud industry model of terms and conditions or service level agreements.

Regulation must provide guarantees by reducing the risk associated with cloud computing services to foster their adoptions. On the one hand, it is necessary that contracts accurately determine the data storage and processing location to know the jurisdiction applied to data protection; on the other hand, service providers must be forced to include clauses on notification of security incidents, data recovery procedures, the maximum time of service unavailability and end contracts conditions.

We must not forget the crucial role of regulation in the standardization of cloud computing services to enable interoperability and reversibility. Indeed, the format of data and interfaces of cloud applications, currently used, are not standardized which raises the problem of data portability, a situation considered anti-competitive because it does not give the possibility to change service provider.

Given its cross-border character, the cloud computing market requires coordination at the international level; covering technical, commercial and regulatory aspects. The development of cloud services requires that the states and specialized bodies harmonize their approaches in the adopted standards, security policies and the fight against the vulnerabilities associated with the use of these new services.

4 Some recommendations

Aware of the opportunities and benefits of cloud computing adoption, several specialized agencies have issued a set of recommendations whose main objective is to achieve its emergence and its

marketing by removing the technical, legal and organizational constraints that arise in the introduction and implementation of its services.

Commission Nationale de l'Informatique et des Libertés (CNIL-France) [21]	Business Software Alliance [22]	ITU [23] (in Africa)
1. Clearly identify the data and data processing transiting in the cloud; 2. Defining your own requirements of technical and legal security; 3. Conduct a risk analysis to identify key security measures to be implemented; 4. Identify the relevant type of cloud for the proposed treatment; 5. Choose a service provider with sufficient safeguards.	1. To protect the users privacy while allowing free movement of data and free trade, 2. To promote advanced cyber security practices without imposing the use of specific technologies, 3. To fight against cybercrime with effective deterrents and clear reasons for prosecution of criminals, 4. To establish robust protection mechanisms and vigorous means to fight against the diversion and offenses related to cloud technologies, 5. To encourage openness and interoperability of vendors and cloud solutions, 6. To promote free trade by lowering barriers and eliminating preferences for certain products or companies, 7. To encourage the private sector to invest in broadband infrastructure and to promote universal access to broadband.	1. Effective regulatory progress ; 2. Maintain a regulatory watch ; 3. Careful preparation of cloud computing outsourcing contracts ; 4. Conformity with existing provisions ; 5. Qualities of data centers Establishment of data centers ; 6. Qualities of data ; 7. Introduction and/or upgrading of regulations ; 8. The launch of training programs ; 9. Cross-border standardization and regulation ;

Table 5: The recommendations of specialized organization

The common denominator between the different recommendations proposed is that they all attempt to remove a number of inherent difficulties to the compliance with legislation and security standards for the data and application protection, to propose standardization and cross-border cooperation in the provision of Cloud Computing services and finally treat outsourcing contracts organizing the customer / supplier relationship.

In general, we can summarize the recommendations and best practices that can facilitate the adoption of cloud computing services in the following points:

- Promote the development of critical broadband infrastructure for cloud computing services;
- Encourage the establishment of standards for the Cloud and their integration with the existing solutions;
- Develop security standards and security level tests for cloud service providers;
- Create an environment of transparency and trust;
- Apply certain domestic laws that require service providers to protect sensitive data in certain sectors, e.g. the Gramm-Leach-Bliley Act for financial services or the HIPAA for healthcare providers…
- Correct Cloud contracts to include: a rigorous definition of responsibilities, security safeguards, requirements on the location of data and / or applications, the terms of interoperability and availability, end conditions contracts, notification of risks, the chain of subcontractors ...;
- Adopt a participatory approach involving all stakeholders in the implementation of the rules on Cloud Computing;
- Strengthen regional and international cooperation in cloud computing.

5 Conclusion

Cloud computing is clearly a novel growth factor for companies in general and ICT in particular. Indeed, it presents some opportunities for reducing costs, improving performance and value creation. However, its adoption requires the reduction of certain risks relating to its functioning. It is in this sense that the regulatory intervention has become essential to establish a consistent regulatory, technical and organizational framework to guarantee transparency and the adoption of best practices.

Particular attention should be paid to service contracts binding customers to suppliers in accordance with the legislation on data protection, fair competition and consumer protection.

In addition, since the Cloud computing market is beyond geographical boundaries, it is inevitable to coordinate at a regional and an international level to standardize tools, to establish common legislation and to collaborate in the fight against the associated risks to these services.

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