# RISK AS SOURCE OF RELUCTANCE TO SAAS ADOPTION IN EUROPE

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### Abstract

Cloud computing is among the most discussed issues in the information communication and technology (ICT) sector. Information technology (IT) infrastructure is altered by the business methods due to cloud computing and moved ahead towards a utility model of 'pay as you go'. Instead of spending time with constructing, managing, maintaining and running their own physical infrastructure, now firms can host their applications, platforms and storage in data centers on virtual servers supported by professional third parties. Such services based out of the 'cloud' assist agile and cost efficient business surroundings. The most essential economic influence of cloud technology could exist in developed competitiveness and cost savings of existing IT services, as well as in introducing new services to private and public companies. Because of the bulk buying of hardware and processing power, demand aggregation, and decreased costs of labor per unit, cloud providers can achieve essential savings on their running price and pass these on to their customers. Businesses can utilize the cloud computing technologies, thereby using better equipment with more flexibility, being faster, and having lower expenditures of capital. Customers of cloud computing technologies make data and online content interactive and accessible for users. Given the importance of cloud computing, not many studies have been conducted from the adoption perspective and, in particular, have not sought to identify factors of risk in the most popular cloud computing deployment model, which is Software-as-a-Service (SaaS). This paper provides an overview on the European cloud computing perspective and assesses the risks in SaaS.

### JEL Classification: L86

Keywords: Cloud Coomputing, SaaS, Software-as-a-Service, Europe, Risks.

### 1. Introduction to Cloud Computing

Cloud computing is a model for enhancing convenient, on demand and ubiquitous access of network to shared areas of designed computing networks, resources, applications, services, servers and storage that can be supplied and liberated with reduced efforts of management or interaction of service providers. The most essential economic influence of cloud technology could exist in developed competitiveness and cost savings of information technology services available to private and public companies as well as chances leading to new services. Because of bulk buying of hardware and demand aggregation cloud providers decreased costs of labor per unit. They can achieve essential savings on their running price and pass these on to their consumers. Businesses can utilize technologies of cloud computing for information technology supply thereby using better equipment, being rapid, being much flexible and having less expenditure of capital. For customers the technologies of cloud computing are making online data and content more interactive and accessible. Cloud computing solutions are the solutions of the new age of information technology offering numerous benefits to its customers. Cloud-based solutions offer cost effective services to customers for which they can pay based on their usage. This makes cloud based solutions favorable for most of the customers in the corporate world.

### 2. An overview of the European cloud computing perspective

According to Kushida *et al.* (2012) cloud computing is modifying the way business is being performed by altering the underlying infrastructure of information technology. Computing is moving ahead towards a utility model of pay as you go. Rather than spending in constructing, managing, maintaining and running their own physical infrastructure, now firms can host their processes of business on virtual servers provided data centers in the state of art performed by professional third parties. Such services based would one call "out of the cloud" and they would assist agile and cost efficient business surroundings. The adoption rate varies around the globe.

International Data Corporation (IDC, 2008) evaluated that in 2015 \$9 Billion will be invested in the services of professional cloud in Europe, a development from \$570 Million in 2010. While present applications provided in the cloud may be basic backup/disaster recovery, management of electronic mail, web hosting and storage, organizations are already initiating the usage of cloud for core applications.

TechMarketView recommends United Kingdom's market of cloud computing will increase from \$3 Billion in 2010 to \$6 Billion in 2014 and similar development is anticipated by Experton Group in Germany from \$2 Billion in 2010 to \$9 Billion in 2015. Such rates of development represent that Europeans view cloud as moving ahead spelling first mover benefits for those able to travel quickly. It is difficult to align what Europeans expect from their cloud solution with the US American market (IDC, 2010).

According to IDC (2008) a distributed group of data centers in Europe permits cloud service providers to provide their consumers transparency and a selection of free choice of storage locations. It is essentially critical for 3rd party owners of the data centers to ensure integrity, availability and confidentiality of the entire data, whether in a private cloud or multi-tenancy servers. The providers of data centers must offer straight access to a vast number of local and international low latency, high speed mobile and broadband networks preferably from numerous Tier 1 operators. Their facilities must involve networks of content distribution, tracing platforms and points of internet exchange as well as distributed but interacting hubs of cloud supporting seamless pan-European and worldwide connectivity. With these practical assurances, new entrants into the European market have a strong discussion. The cloud expertise of cloud service providers constructed in the thriving US market and integrated with a clear understanding of regional market drivers, local business and law cultures plus assisted by best of breed hosted information technology facilities from a trusted 3rd party could lead into a sustainable and rapid entry into Europe. It is found that the European Union market of public cloud is developing three times more rapid than general information technology (EU, 2011).

According to Kar (2012) Europe needs coordinated action in the computing field. But several users are still hesitant to face technical and complex difficulties and security of data particularly when it comes to confidentiality of data. In Europe the strategy of the Commission must represent 3 drawbacks of cloud: the contractual uncertainties of digital single markets, the fragmentation of data and the cloud standards' fragmentation. Therefore the Commission has declared 4 measures to develop cloud computing productivity.

The 4 measures are:

1) Assist schemes of certification for reliability of cloud service across the European Union.

2) Assure portability of data, reversibility and interoperability for cloud service users. Essential standards must be set up by 2013.

3) Develop fair agreements and safe standards for cloud computing including service level agreements.

4) Undergo a partnership on cloud computing between businesses and member states which would use the buying powers of the public and private sectors in order to shape the cloud computing market in Europe, deliver better and affordable services for e-government and business cloud service usage.



Figure 1: Cloud computing market development in European Union

Source: Adopted from Bradshaw et al. (2012)

## 3. Software-as-a-Service (SaaS)

The idea of using a software for service is as old as the corporate computing as per Gerard (2008). From the beginning of the mainframe era of 1960s and into the modern day minicomputer, computers were costly till 1970's and various small and medium enterprises (SME) possessed sources of computing as a way to gain distant access. Software delivery modules, on request have been progressing in the late 1990's that dwell in many forms and varieties incorporating provision for services like application service provision (ASP) and business service provision (BSP). These types of services that are supported by demand render users and enterprises, along

with an internet based retrieval of resources, proficiency, and a unique range of intricate applications covering an organization's complete real value chain. In the current IT literature, concerned with research and management, arguments based on ASP and outsourcing have been quite silent, importantly due to the reasons of very few successful stories. As an alternative, a delivery model based on new on-demand processes, which is known as Software-as-a-Service (SaaS) has gained consideration of IT researchers and officials. In reality, SaaS is recognized as an on-demand software service module and it is an integral part of cloud computing marvels.

# Figure 2: Evolution of SaaS



Source: SaaSdevinmexico.wordpress (2009)

SaaS is forecasted to become significantly important in almost all enterprise application software (EAS) markets as per a study conducted by Gartner (2011). Throughout the globe software revenue related to SaaS was predicted to grow up to 19.4% between 2008 and 2013. Professionals and researchers predict assured

prospects for the effective implementation of SaaS, particularly in all application service markets that require low stages of system customization (e.g. Office suites).

	2011	2012	2013	2014	2015	2016
Business Intelligence	5	6	7	8	10	11
Customer Relationship Management	35	39	42	44	46	48
Digital Content Creation	6	7	9	11	15	17
Enterprise Content Management	6	8	10	11	11	12
Enterprise Resource Planning	8	10	12	14	15	17
Office Suites	2	3	3	4	5	6
Project and Portfolio Management	17	20	26	29	31	32
Supply Chain Management	16	18	21	23	26	28
Web Conferencing, Teaming Platforms and Social Software Suites	70	69	69	68	67	65
Other Application Software	7	8	9	10	11	13
Total	12	13	15	17	18	20

Figure 3: SaaS revenue within sizing of enterprise software 2011-2016

Source: Gartner (2011)

Even though, not everyone is positive about the implementation of SaaS. Particularly, few organizations and researchers are doubtful about its feasibility and functionality in robust EAS markets like that of Enterprise Resource Planning (ERP). The significant limits are noted as the issues concerned with reliability, (i.e., firm access to the service), security for the stored information and confidential issues (that is breach of information and inadequate protection for the stored data), and the process viability (like execution capability and quality service rendered).

# 3.1 Salient risk beliefs in SaaS adoption

Cummingham (1967) developed a framework for the known risks to bring out a Hypothesis on the risk factors that can influence an individual on the overall risks. Known risks have been defined as the "expectation of losses associated with purchase and acts as an inhibitor to purchase behavior". The inability of SaaS not delivering the level of services that is expected would be referred to as **performance risk**, which is 'SaaS cannot provide the availability of application/network bandwidth as originally stipulated by the provider'. All customers can be affected at once by connectivity problems and system outrages which will imply a high value at risk. Additionally, performance risk includes those risk problems which are related to the interoperability of the SaaS application with the home grown applications that are located on the client side. Performance risk can lead to potential losses crippling the day to day operation and this lack of support can lead to organizational inefficiency or great damage to the reputation of the organization if a customer-oriented process is affected. Some potential sources of failure are a lack of vendor capabilities, the poor service level agreement (SLA) management and the inability to provide customers the agreed-upon resources.

**Economic risk** show that a SaaS client may be expected to pay more in order to receive that level of service which he anticipated initially- the so-called 'hidden costs'. Specific investments are shifted to clients by the architectural approach of SaaS, thus making the client responsible for maintaining the customized components. Therefore, to own it is the only solution if the client wants to customize the application core. In case the client is keen to use to standard core, he may want to build components on top of the core functionality using application programming interfaces (APIs) in order to suit his needs with regards to customization and integration. These additional or changing future requirements may lead to higher than expected costs and these increasing costs can emerge hold-up because the ownership of the vendor regarding the application core provides with more power to bargain in the future. This allows him to charge extra costs, increased prices and also refused to invest for the client's customized code in backward-compatible interfaces.

**Strategic risks** are those risks in which a company will lose the capability and the resources when sourcing applications via SaaS. This matters inadvertently in cases of business critical application and those applications which support important functional areas in an organization. If these resources are externally outsourced they can lead to a high level of interdependence between the vendor firm and the client. The adoption of SaaS can reduce the ability of a company to react quickly to new internal forces (example by aligning itself with new business strategies and external forces, example by seizing new market opportunities.) The reduction in ability can be because of the SaaS provider having full control on the maintenance and development of the application. Apprehending such potential resource dependence

dence, one can argue that the perceptions of the IT executives regarding the risk associated with SaaS adoption are relevant, salient beliefs that can have an influence on the overall vision of SaaS adoption risks.

A direct control of their data (and thus the valuable asset) is given by the SaaS client to the provider without knowing how secured their data is and which disaster recovery and backup procedures he has intact to secure the exact data levels. Service level agreements can be used but however the experience of a client in sourcing software through a service provider is often slight. Moreover, there is such a swift progress in technological developments that clients are quite unaware about the risks their data faces as regards security from contractual flexibility when signing a service contract. Loopholes and equivocality in the contract can prompt the vendor to take advantage of their client.

In addition, the characteristics of technologies that are web based and uncertainties related to environment cannot be predicted easily. Incidences of security breaches like theft of data or corruption might trigger stress, discomfort and anxiety among potential SaaS customers. As IT executives anticipate these possible security risks beforehand, it can be assumed that such security risks form a salient feature that would affect the perceived risk.

**Managerial risks**, also known as **psychosocial risks** in earlier studies can occur if the software is outsourced to external firms, as it would put the reputation and the career span of the manager, who bears this responsibility, at stake. This is because the associate ventures that deal in outsourcing ventures usually associated with negative aspects such as failure to provide outsourcing jobs within the deadline or loss of jobs to the person responsible. This would also affect the way the peers, staff and clients of a firm perceive their managers in terms of loss of power owing to the inability to control the resources. During the process of SaaS adoption, it can be assumed that the executives of IT departments are highly aware about all the negative consequences that are personal in nature. This leads to the argument that perceptions about the managerial risks of the IT executive influences the perceived risks involved in SaaS adoption.

### 3.2 Major sources of reluctance for the adoption of SaaS

Various factors affecting the adoption of SaaS can be identified and addressed with the help of prescriptive theory. This paper has classified reluctance factors into technology, psychology, security risk, financial risk, strategic risk, psychosocial risk, service provider and product provider risk. In terms of technology, the major sources of risk are lack of adequate computer skills, lack of user friendly SaaS programs, data storage issues, information security and compliance issues. Under psychology, the major non-adopting factors are personality and attitude barriers such as lack of trust, resistance towards change, resistance towards taking risk and previous worst experience. Similarly, the security risk factors identified from the study are lack of reliability among service provided by SaaS provider, data security issues, privacy issues and compliance issues. Strategic risk comprises limited flexibility of organization, limited customer service and data security issues. In addition, lack of awareness regarding actual cost and unexpected transactional costs are classified as financial risk of SaaS implementation. In this study, psychosocial barrier is described as individual's fear over their reputation due to SaaS implementation. It also includes the fear of individual whether SaaS implementation affects their business relationship. Service provider risks include lack of trust, reliability of the services offered by provider, data security issues, compatibility issues and technical and maintenance support issues. Finally, product provider issues comprise technical features of the product, lack of reliability, price, security issues, and unexpected transition costs.

### Figure 4: Reluctance of consumer buying



### 4. Conclusion

The present paper reveals the risks with regard to SaaS deployments. Hence, SaaS providers should focus on training and awareness programs focusing on its advantages, lower TCO, easy accessibility, integrity, ease of operation, and other favorable factors. It is necessary to compare the benefits and risks associated with SaaS and to utilize an appropriate decision-making strategy. Moreover, the importance of excellent customer service and of effective promotional strategies such as free trial, pay per service, customer success stories is at hand. Furthermore, customer success stories help to overcome financial, technological, psychological, strategic, psychosocial, service and product provider barriers. Service providers should focus on improving data security, privacy and technological features to increase the SaaS adoption rate in the European region.

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