

Cloud Computing: Risks and Opportunities for Corporate Social Responsibility

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Abstract This paper studies the impact of the information and communication technologies (ICT) used by organizations in their Corporate Social Responsibility (CSR) strategy. In particular, it analyses the impact of the most recent technological development, Cloud Computing, on the corporate users that adopt this service. What key issues need to be addressed by companies that use Cloud Computing? What is the impact of these choices on their CSR strategy? What strategic approaches best marry the company's ICT decisions with its CSR reputation?

Keywords Cloud computing · Corporate social responsibility · IT services · Centralised architectures · Information security · Organization

1 Introduction

The subject of this article concerns the impact of choices relating to information technology on strategies for Corporate Social Responsibility (i.e. CSR).

The first part is devoted to the most recent revolution in the field of information technology—Cloud Computing—then follows a brief description of CSR.

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The third part of this study examines the relationships that can link these two areas of primary importance for the life of businesses in the twenty-first century.

The context of the article is that businesses and organizations face complicated choices related to the migration of some or all of their information services and communications into the cloud [1]. This implies many technological and organizational changes, so it is necessary to assess their impact, especially for an organization with a solid strategy [2].

Information technology indeed offers many opportunities for businesses, but there are also multiple risks. This article aims not only to provide an overview of the most controversial aspects but also proposes some guidelines to face them.

2 Cloud Computing: An Overview

Cloud Computing is a classic example of a socio-technical system in which technology also includes organizational social values. For many businesses, it is advantageous to transfer the ICT capital expenditure (CAPEX) to operational expenditure (OPEX) and this is what cloud computing can offer [3].

Capital expenditure includes amortisation of investments in infrastructure, space for equipment, specialised personnel, etc. Operational expenditure enables consideration of the computer as a service on demand set against the basis of a payment based on consumption by eliminating the investment and depreciation thereof.

On the other hand, cloud computing is a step backwards towards a centralised structure where the only entities able to provide ICT services (both for processing and for data storage) are those with huge data centres.

The approach of more recent developments in the history of computing, known as Cloud Computing, is to make available a global infrastructure with the following characteristics [4]:

- Based on broadband networks available in many countries;
- Based on servers and pooled multi-tenant platforms;
- Can be easily scaled and flexible;
- Measurable (providing services based on consumption requires them to be quantified);
- Available on-demand and as self-service.

For many small businesses this concept represents a real opportunity. They can have access to all possible software and applications without having to install them on their computers [5]: the software becomes a service (SaaS, Software as a Service). They also have the ability to access any form of application development environment (PaaS, Platform as a Service) and virtualised ICT resources (IaaS, Infrastructure as a Service). All of these services allow them to reduce or eliminate space for ICT equipment, the acquisition and maintenance of server systems and staff for ICT operations which enables them to focus primarily on their business [6]. For this purpose, it is sufficient to have a broadband network and a series of access

devices for users (PCs, smartphones, tablets), thereby using these devices as a simple interface to access the “cloud”.

Regarding costs, the operation is advantageous because the ICT sector becomes a service paid according to consumption, moving from CAPEX to OPEX. For example, for a small business (such as a start-up in a university incubator), a Public Cloud offers the possibility to make computing power and storage space virtually unlimited, fast and on demand [7]. On the other hand, this system is a significant shift towards a highly centralised computer architecture. Dependence on large datacentres is becoming more and more evident. In the seventies, ICT abandoned the mainframe for the PC, yet today in the twenty-first century, it is doing the reverse by turning once more to highly centralised structures. Of the five core computer functions, only the input, output and communication via the Internet remain in the users’ domain, while storage and processing are now in the cloud (see Fig. 1).

The new model is quite different from the peer-to-peer architecture of Internet history [8]. We are returning to a one-to-many architecture very close to centralised distribution (broadcasting). It happens more and more that users surf the net and use software in the cloud through a simple touch screen [2]. The centre of the cloud is even able to turn off machines and operational systems in the hands of users, using a

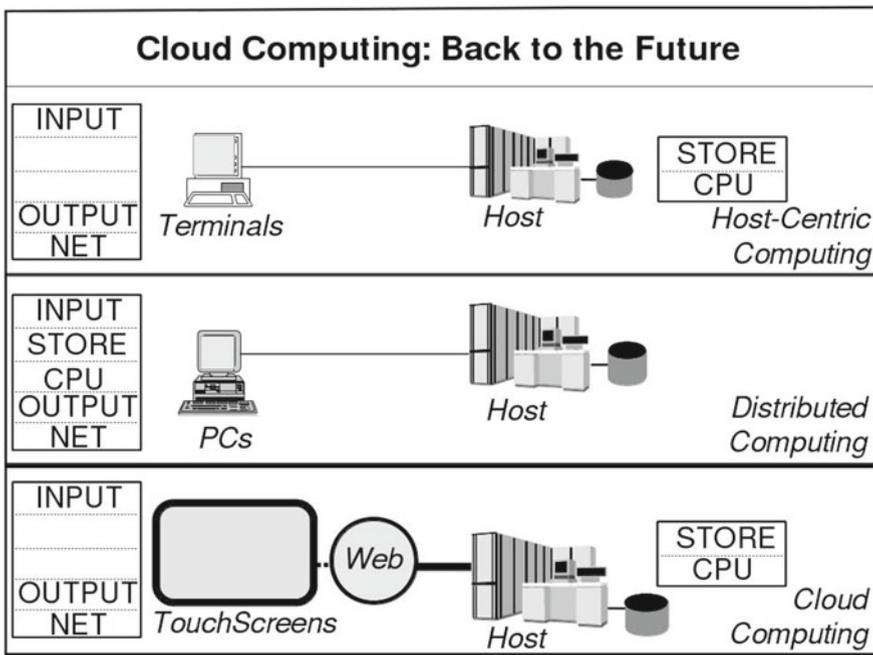


Fig. 1 Cloud computing: back to the future

device called a “kill switch” [9]. The risk of losing the status of digital citizenship to become a mere digital consumer is growing [10–12].

3 Corporate Social Responsibility: A Brief Overview

The realization of profits was for many years considered the sole purpose of businesses. Yet much research has been devoted to business ethics: “... the discipline of applied ethics that focuses on the moral aspects of the business” [13]. This form of applied ethics seeks to answer the question, “how, and in whose interests, ought the corporation to be governed?”. For a long time and in many contexts, a single response was considered based on the Milton Friedman’s Theory of Shareholders which says that the company’s task is to maximize profits in the interests of shareholders [14]. However, more recently, other positions have emerged such as that held by Edward R. Freeman to whom we owe the Theory of Stakeholders that affirms that the company must be managed so as to take into account the interests of all stakeholders with whom it is in relationships [15].

The debate that ensued was not only academic in nature, but it has spread within the companies themselves. Often, this management model is assimilated to CSR which is a form of self-regulation that the company requires and includes among its management processes. It gives rise to a series of guidelines, mechanisms that self-commit the company to respect certain international ethical standards [16]. It is undeniable that CSR is more in concordance with the Theory of Stakeholders, in particular because it takes into account all the actors involved in the activity; the company is not tied solely to shareholders. CSR involves a consideration of everything and everyone that can contribute to the achievement of the company’s profits, whether in environment, consumers or employees. Its essential purpose is to ensure the existence of the company in the long-term even, in some cases, by decreasing short-term profits. For this purpose, the European Commission has recently published an important document to redefine the concept of CSR “*as the responsibility vis-à-vis the companies they exert effects on society ... [To do this] should be that companies have engaged in close collaboration with their stakeholders, a process to integrate social concerns, environmental, ethics, human rights and consumer organizations in their commercial activities and basic strategy*” [17]. Similar recommendations are included in major voluntary lines of the ISO (International Organization for Standardization) published under the title of “ISO 26000”. They describe principles of social responsibility which include human rights, respect for the rights of workers, the environment and community involvement [18, 19].

While observing these precepts is voluntary, we see that this mandate is trying to attract the attention of many organizations, especially in recent years as information technology (the web) now demands greater transparency and awareness for all business operations, and consumers are becoming increasingly sensitive.

4 Relationship Between Cloud Computing and Corporate Social Responsibility

The connections between the ICT tools used by organizations and their effectiveness with respect to customers and users has now been studied for some years to the point that cultural institutions such as museums have not escaped the analysis [20]. In the particular case of Cloud Computing, technology choices have far greater consequences at the organizational level in terms of customer service and corporate reputation.

This could also affect CSR strategies. In fact, organizations with a well-defined CSR strategy prefer to monitor closely the “borders” of the company and the behavior of their suppliers [21]. In general, they access ICT services that are outside their firewall only for some specific, non-mission critical applications.

As regards to cloud computing, the temptation to extend the acquisition of ICT services from outside is very strong. It can certainly be an opportunity for businesses, but it also raises several important issues which we examine here.

Governance. In IaaS and PaaS models, the company still has control of the final applications (IT levels on software application and services). It “rents” only basic computing resources (computing levels for servers, storage and network) from an outside vendor. With the SaaS model, the company entrusts the entire ICT protocol stack (applications, services, servers, storage and networks) [22, 23] to the cloud provider. For a socially responsible organization, governance of IT infrastructure is fundamental because nowadays they have become critical to any form of activity [24]. This outward movement of the control of ICT infrastructures related to the Cloud implies a radical revolution in organizational terms. Those responsible for ICT, as one of the main stakeholders of the company, may find their jobs in jeopardy. The problem of “shutdown” of the computer room and the loss of all the ICT skills of the people who work there, cannot be dismissed lightly by a company with a strong CSR.

The perimeter of the company. For many organizations the firewall, the security device that separates the corporate network (intranet) from the public network (Internet) is the main organization border. With the adoption of information technology services by the public cloud, this separation has decayed. The storage and processing of data takes place outside the corporate boundaries. The devices used by employees of the company are reduced to simple input and output interfaces. This puts socially responsible companies in a position to rethink their borders in line with those who are among the major stakeholders: customers [1].

Contractual obligations. If anyone can easily acquire computing resources in the cloud, then there will be organizations that buy resources simply to sell them. The risk for a socially responsible company is to entrust their data and processing to a simple “broker” and not to true computer professionals. The risk is to rely on a cloud provider who is not the real owner of the resources but merely an intermediary [25]. All research on the RSI confirms that the length of the chain of suppliers (“supply-chain”) is one of the most critical aspects to be monitored [26].

System administrators. When there are too many people with system administrator privileges, there is the so-called “problem of many-hands” [27] in critical resources. For example, what if a cloud provider system administrator decides, for maintenance reasons, to stop a server? Will the related service just be interrupted? Will the company that has entrusted its ICT services to its cloud provider be warned? How will the cloud provider reconcile the need for maintenance with the need for continuity of service enterprise (cloud user) towards its customers?

Risk management. Although it is not admitted so explicitly in public, computer scientists know very well that software and complex systems are by definition unreliable (exhaustive testing is impossible, being subject to the so-called combinatorial “explosion” typical of finite state machines) and only the main functions are tested in the laboratory. What happens when you have a failure in the chain of user—network—cloud user—network—cloud provider? In fact, in a Cloud Computing scenario, responsibility of computer professionals in the design of complex systems becomes even more important [28, 29]. The reliability of systems and all matters related to software (from the limits of the reliability of the software to the responsibility of the software designers) are still present. They have simply moved from within the company to the “centre” of the cloud.

Legal issues. Many companies need to know, sometimes for legal reasons, the physical location of the data: the country and the relevant jurisdiction where the data is managed by the cloud provider. For example, it is essential for financial organizations or governments to know exactly where their data is located.

Open and free market. Often, companies must change providers for many different reasons (reliability, organizational change, business models, etc.) [30]. Will it be easier to change providers of ICT services in the cloud (cloud provider)? How can one avoid getting stuck with a provider (“lock-in”) that has proven to be unreliable? Or with a supplier with a CSR strategy that is not consistent with the one that buys the services? In what formats are the data stored? Will they be open formats? These issues of standard formats of data and the risk of “lock-in” are the most critical issues associated with the adoption of Cloud Computing for an organization with a strong CSR strategy [1, 31]. In the ICT industry, Cloud Computing services are undergoing a process of consolidation that further worsens these aspects. The risk of having technologies that work with a supplier but that do not interface with any competitors is very high. The interoperability of open standards of the Web is seriously challenged by the titans of the network (for example, Microsoft, Apple, Google, Amazon, Facebook).

How to deal with the main issues. How can a company with a strong CSR approach equip itself to face the risks of Cloud Computing? Are the benefits of moving to ICT as a service, which does not require large investments, compatible with a policy of respect for all stakeholders of the company? For example, how will it change ICT governance? Is it realistic that there will be no more need for computer experts in a socially responsible business that adopts Cloud Computing? Is it realistic that the CIO (Chief Information Officer) is destined to disappear? It would not be the first time in the history of computing that organizations that manage technology have to undergo radical changes. Yet the trend towards the

automation of many business processes and the growing importance of data (“Big Data”) requires socially responsible organizations to design very carefully the process of migration to the cloud to maintain skills within them. One can turn off the computer room, but not the skills on the data, their security, their analysis and visualisation. Competent people able to “extract value” from the data will still be necessary for any business. The risk of lack of transparency in the supply chain (one of the most controversial aspects of CSR) can be faced by taking specific measures. For example, a company can ask the cloud provider to prove that they are actually the owner and controller of the infrastructure and not just a “broker”. This is possible, for example, by including specific clauses in the contract. The same applies to the issue of too many hands on the systems; for some maintenance operations by the cloud provider, cloud users may require that directors from both sides agree (“four-hands authorisation”).

An aspect not to be overlooked in the drafting of a Cloud Computing contract is the traceability of events. If a “computer crash” (data loss, software malfunction etc.) occurs, it must be possible to find out what happened (“cloud traceability”). It will be necessary to store the events log in a safe place, accessible only to the involved company (with the exact date of the events, all protected by “electronic signatures” and encryption). At the very least, the risk management plan of the company should be revised, taking into account the plan of the cloud provider. This will avoid the risk of having two plans either not in synch or even in conflict. It is not a coincidence that some have started to consider “cyber-insurance” to cover technology risks [32]. Many organizations require the cloud provider to provide explicitly the place of data storage or even demand that they be stored only in specific countries with adequate legal systems. The risk of “dependency” (“lock-in”) still has much to mitigate in the world of cloud computing, and the spread of open standards is still a very difficult issue. Yet this aspect for CSR is fundamental. For example, many consumers are asking companies to be transparent about their environmental impact [33].

A company with a strong CSR may, for example, ask the cloud provider to explain the sources of energy used to power its huge datacentres. How many of these are sources of renewable energy? [34]. The company may have to change cloud providers if this does not fully meet its strategy of environmental sustainability, but changing providers without open standards may turn out to be very difficult, if not impossible.

5 Conclusions

The whole Theory of Stakeholders in the field of “business ethics” is based on balancing the interests of all the stakeholders. CSR translates this theory into practice. A company with a strong CSR strategy must be able to identify all the nodes in the network of stakeholders around it.

Cloud computing, on the one hand, simplifies the use of computer services (transition from CAPEX to OPEX), on the other hand, however, this simplification is done at the cost of greater complexity of the supply-chain in the ICT market. For a company, it becomes more difficult to design its network of stakeholders: not everything is under the strict control of corporate ICT and the ICT supply-chain becomes even more extended. A company may find itself managing a business providing products or services to its customers using a cloud computing infrastructure that is not consistent with the company's ethical principles, and this requires close attention in many aspects [35].

The Theory of Stakeholders (stakeholders) is not sufficient to prepare a solid CSR strategy; however, its definition helps to design precisely the stakeholders' networks around the company and this helps to make the right management of links between CSR and ICT. Cloud computing makes this task much more complex, but the most advanced companies in CSR and in ICT strategy are aware that the choices in these fields are becoming increasingly aligned. This article has analysed, from a company point of view, some of the most critical issues related to the adoption of cloud computing: the loss of control of the governance of IT, the loss of the very meaning of corporate boundaries, the assignment of services to simple "brokers" (which would lengthen further the supply-chain), the difficulty in ensuring continuity of services to its clients when the critical infrastructure is managed by an outside vendor, the further worsening of IT risks, the need for the company to revise its risk management plans to make them consistent with those of the cloud provider, the loss of control over data, the difficulty in changing supplier.

Cloud Computing exposes a company with a strong social responsibility to risks that must be addressed on time. This article aims to provide a contribution to companies that want to mitigate these risks, helping to define a strategy for migration to Cloud Computing consistent with their CSR strategy.

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