

# Analyzing Cloud-based Startups: Evidence from a Case Study in Italy

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## Abstract

The aim of this study is to analyze the reasons behind the adoption of cloud computing and its implementation process in startup firms as well as to verify the advantages and disadvantages deriving from the adoption of this tool and how it could increase entrepreneurial activities. We applied a research framework developed by previous scholars on cloud adoption within SMEs in an attempt to adapt it to startup firms. In particular, we conducted a case study in an Italian technological startup.

Our results show that cloud technology supports and facilitates entrepreneurial activity, especially reducing several entry barriers for new entrepreneurs. This study contributes to the existing literature on cloud computing, and it has several managerial implications. First, it shows that setting up the organizational model on cloud computing allows entrepreneurs to reduce organizational efforts and ICT investments. Furthermore, this technology can reduce diversification costs by eliminating entry barriers, thus opening new markets and opportunities for entrepreneurs.

**Keywords:** cloud computing, startup, SMEs, case study, Italy

## 1. Introduction

Cloud computing has totally revolutionized the Information & Communication Technology (ICT) market, and it has been considered a suitable tool for solving common problems related to ICT (Gartner, 2010).

According to Sultan and Van de Bunt-Kokhuis (2012), cloud computing, as defined by Christensen (Christensen and Raynor, 2003; Christensen et al., 2004), presents an innovation, as it allows firms to benefit from different kinds of services (hard memories, storage, computer network management, operating systems, applications, sensitive data management, etc.) at low prices and with great flexibility and scalability (Ibrahim et al., 2011; Buyya et al., 2008; Marston et al., 2011; Sultan, 2011; Kaiserswerth et al., 2012; Lee e Mautz, 2012). Cloud computing allows firms to then manage ICT requirements in an innovative and completely different way (Ibrahim et al., 2011) by changing market dynamics both from the demand as well as offer point of view (Buyya et al., 2008; Eto, 2009).

Microsoft (2012) and Nuvolaitaliana (2013) have shown an increasing adoption of cloud computing in startup firms. Recently, several authors have focused their studies on these kinds of firms (Sultan, 2014; Ross and Blumenstein, 2015), with a particular emphasis on advantages and new opportunities related to the adoption of cloud computing (Sultan, 2011; Ross and Blumenstein, 2012, 2013; daSilva et al., 2014): this new technology, in fact, has generated a new global market thanks to the increasing adoption of devices such as smartphone and tablets. This, in turn, has led to the birth of a new generation of startup firms (Ross and Blumenstein, 2015) strongly oriented toward product innovation (Sultan, 2011) and sales strategies (Armbroust et al., 2010).

Gagliardi (2013) highlights that these firms are totally designed on new technologies based on the Internet (such as cloud computing), thus changing the old paradigm according to which ICT structure is influenced by the organization model (Laudon, 1985; King et al., 1994) into a paradigm where the organizational model is influenced by the ICT structure adopted (Laudon and Laudon, 1996).

Actually, the academic literature has not investigated into the reasons as to why startup firms adopt cloud computing, into implementation issues, and into the real contribution of this instrument in startups. This paper aims to fill this gap examining the use of cloud computing by a technological startup and verifying how this tool supports business growth. To reach this aim a case study on an Italian hi-tech startup was proposed. We choose the

Italian setting because of the technological backwardness of the country (Bank of Italy, 2012), which has created strong entry barriers to the market of technology services for small and medium-sized enterprises (SME). Indeed, just in recent years, Italy has been facing a technological revolution based on cloud technologies (Politecnico di Milano, 2014) and, as a result, there have been an increasing number of new cloud-based startups (Politecnico di Milano, 2013; 2014) thanks to the cloud's ability to partially reduce economic and technological entry barriers. Italy is characterized by an increasing number of startups and by several programs that emphasize the importance of new technology introductions supporting their dissemination (NuvolaItaliana, 2014). Also, there is a strong attention on the topic given by Italian Government and practitioners (Bank of Italy, 2009; Caldarelli et al., 2017).

This paper is organized as follows. Section 2 analyzes the literature on the advantages and disadvantages related to the adoption of cloud computing. Section 3 identifies the theoretical framework. Section 4 outlines the research design. Section 5 presents the results of the case study, and section 6 provides some concluding remarks.

## 2. Cloud Computing and Startups

Several studies have highlighted how ICT is able to support businesses' and firms' growth. In particular, our work focuses on those studies that have shown how firms are able to improve their performance and processes through the use of innovative technologies. Cloud computing seems to be one of the best tools to achieve this result and to revolutionize markets (Sultan, 2013). Cloud technologies, in fact, offer a twofold possibility: on one hand, they grant product innovation, thus allowing firms to focus on new product development and sales within global markets (Buyya et al., 2009; Armbroust, 2010); on the other hand, firms have the possibility to innovate processes in a leaner, faster, and more efficient way (Etro, 2009; Qian et al., 2009). Cloud services also appear to be useful in reducing costs and increasing profitability (Ibrahim et al., 2011; Marston et al., 2011).

Several authors have contributed to the existing literature by focusing on the implementation of cloud computing. In particular, some authors, focusing on SMEs, have shown that the major benefits from the adoption were closely associated with firm size (Lawler et al., 2012; Brender and Markov, 2013; Gupta et al., 2013; Mahmood et al., 2014; Oliveira et al., 2014; Son et al., 2014), while others have shown greater benefits from the implementation of cloud computing in emerging markets (Kshetri, 2013; Subramanian et al., 2014), in the banking sector (Brender and Markov, 2013; Choudhary and Vithayathil, 2013), in the public sector (Kundra, 2011; Singh and Veralakshmi, 2012; Mu and Stern, 2015), in the healthcare sector (Kshetri, 2010; Rosenthal et al., 2010; Lian et al., 2014; Sultan, 2014; Chen and Chen, 2015), and in other relevant sectors (Hsu et al., 2012; Chong et al., 2014; Son et al., 2014).

These studies have highlighted the three main aspects deriving from the introduction of cloud computing in going-concern firms: the improvement of business processes, the reduction of ICT costs, and the difficulties related to the migration phase.

Rosenthal et al. (2009), for example, empirically analyzed the benefits generated by cloud computing in "*biomedical informatics (BMI) community*," highlighting how the introduction of this technology has sped up business processes (thanks to the information available in real time on the platform) and lowered the operating costs of ICT infrastructure. Sultan (2011) analyzed the economic and organizational benefits generated by the introduction of the instrument in an English IT company. The author shows the strong reduction of ICT costs (about 80%) and the relocation of some ICT employees within other departments.

Khajeh-Hosseini et al. (2010) analyzed the advantages and disadvantages deriving from the migration to a cloud system within an SME in the energy sector, highlighting the reduction of 37% of ICT costs and 21% of maintenance operations; but at same time, they evidenced a several problems. First of all, there was a loss of trust by SME customers that manifested the fear of service interruption. Secondly, there was loss of control over data so, in those days were the internet connection service was interrupted, employees were not able to work. This is the main reason on the basis of the considerable employees' resistance.

Velte et al. (2009) provided a detailed guide on the migration to cloud systems, highlighting the reasons for the adoption, the difficulties of implementation, and the related risks. What should be noted is that all these authors have focused on the implementation of cloud computing in going-concern firms without analyzing what could be the contribution of this technology for startup firms. In fact, the benefits evidenced by the literature are likely to be partially weakened when the adoption of the cloud occurs at an intermediate stage of the business life cycle: the transition from a traditional ICT structure to a cloud system involves a critical and complex process of change (Dahbur et al., 2011) to be carefully managed (Ibrahim et al., 2011; Ross and Blumenstein, 2015). The main cause of this negative effect is to be found in the fact that, in going-concern firms, the new information system is influenced by and has to be adapted to the pre-existing organizational model (Kling and Dutton, 1982;

Laudon, 1985; King et al., 1994).

According to Sultan (2011) cloud computing is a tool not suitable for all firms as its convenience strongly depends on the size of the ICT structure, on the structural costs already incurred, on the security costs the firm will have to bear, and on the degree of risk the firm is willing to accept.

On this basis, seems possible to imagine that greater advantage could result from the adoption of cloud computing in a startup firm. Few authors have considered cloud computing as a tool able to bring benefits to companies in the startup phase, where the design of the ICT structure takes place together with that of the organizational structure. This kind of analysis allows the researcher to highlight the full potential and benefits deriving from this technology. In fact, cloud adoption influences both information systems and organizational structure, thus enabling the building of a flexible organization as early as in the startup phase (Khajeh-Hosseini et al., 2010). The rationale for this assertion is twofold in nature. First, cloud computing allows new entrepreneurs to enter those markets with entry barriers such as large investments in ICT; this facilitates startup firms to enter into markets where the expected return on investments (ROI) seems negative or too low, and to eliminate technological constraints and thus obtain a quality of service equal to their main competitors (Marston et al., 2011). Then, the choice to adopt cloud computing in the startup phase allows the firm to achieve relevant organizational advantages. In fact, in a cloud-based startup, it is possible to improve organizational learning, to accelerate product development, and to increase the ICT department's degree of flexibility. These benefits result in less of a need to outsource the production of new knowledge (Ross and Blumenstein, 2015).

On this basis, due to the lack of studies addressing the combination of the above-cited issues, it appears interesting to analyze the main reasons why new entrepreneurs choose the adoption of cloud computing in their startup firms, linking this issue to the different stages of the adoption (the identification of problems that cloud computing is called to solve, the intermediate stages, and the final measurement of the benefits).

### 3. Theoretical Framework and Justifications

The present study attempts to adapt the framework by Ross and Blumenstein (2015) to analyze cloud adoption in startup firms. Figure 1 summarizes the model and its characteristics.

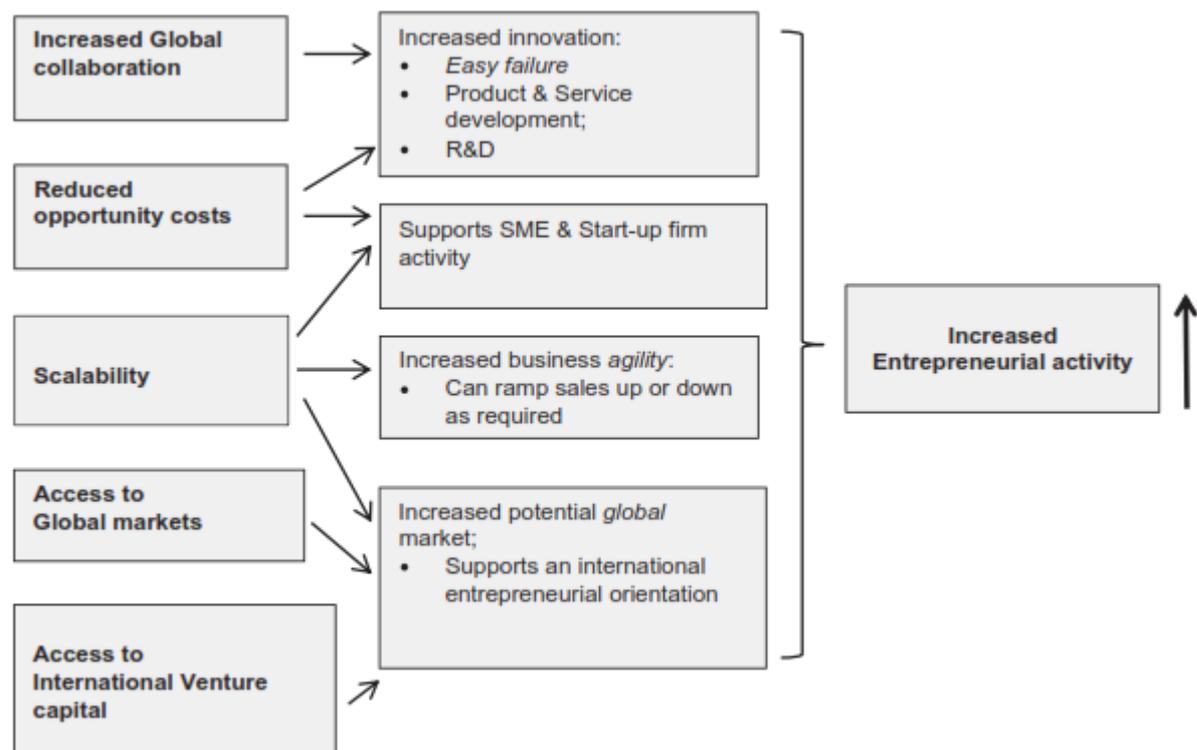


Figure 1. Research framework (Ross and Blumenstein, 2015)

According to this framework, cloud computing is a tool that is able to sustain firms' growth by enabling several interactions among typical factors in modern business. The framework is based on five main aspects: increased

global collaboration, reduced opportunity costs, scalability, access to the global market, and access to international venture capital.

Referring to *increased global collaboration*, we may say that cloud technologies allow collaboration among different areas not characterized by a geographical proximity, thus enabling an international entrepreneurial orientation (Ross and Blumenstein, 2015). This aspect, within startups, has to be considered relative to the opportunities cloud computing may create for new firms, to the openness of markets, and to the opportunity to enter into business networks able to generate greater innovation and to allow the firm's growth. In fact, cloud technologies enable synergies with other actors within the context in which the firms operate or in similar markets, also reducing high investments in R&D.

*Reduced opportunity cost* refers to the cloud's ability to reduce investments and barriers to entering new markets, thus increasing possible business opportunities. The "pay-on-demand" formula often adopted in cloud services represents a valid support enterprise and allows a drastic reduction of the financial requirements needed to create new products or to start a new business (Etro, 2009). Thanks to the huge warehouses supplied by cloud providers, it is possible to benefit from scale economies (Mudge, 2010), with a consequent reduction of the marginal cost of the service as the usage by customers increases. This aspect evidences how this instrument is able to support firms in the startup phase by reducing research and development costs and initial investment in ICT as well as the risks typically related to innovative activities (Casson, 2003; Parker, 2009).

The third aspect to consider is *scalability*. Cloud computing allows firms to manage the service demand in a flexible way (Misra and Mondal, 2010): each cloud user has the possibility to use a larger amount of service to manage critical moments, thus eliminating delays related to the required adjustment time. This flexible structure enables the firm to have an always-appropriate service, avoiding the risk of oversizing the ICT function. Thus, scalability results in a reduction of the investments required, in a service appropriate to customers' demand, and in a faster internationalization process.

Another aspect is *access to the global market*. As already mentioned, cloud computing facilitates the possibility to easily access international markets, thanks to their particular characteristic of being delocalized. This aspect revolutionizes the previous conception of internationalization, according to which a firm, before going international, tried to first grow in their local market and then acquire more information and knowledge about the specific market to enter (Johanson and Vahlne, 2009).

The last aspect is *access to international venture capital*. This aspect is particularly critical for startup firms, which often try to find funds through operations such as venture capital and business angels. In addition, this aspect is directly linked to the cloud's ability to allow access to the global market. In fact, cloud technologies enable SMEs and startups to find easier international partners or potential investors, thanks mainly to the existence of crowdfunding platforms created to promote business based on this type of technology (e.g., CloudCUBE) (Falcon, 2013; Nisen, 2012).

This framework is supported by the fact that several authors (Etro, 2009; Misra and Mondal, 2010) have indicated cloud computing to be a particularly suitable technology for startups, as it allows them to increase their entrepreneurial ability (Ross and Blumenstein, 2015) and to reduce several entry barriers to markets. On this point, the rapid growth of the "Apps" global market provides a good example of how startup firms can easily sell their products to global customers through cloud-based platforms (Ross and Blumenstein, 2015). Knight and Cavusgil (2004), on this point, talk about the emergence of "born global" firms, defined as organizations that begin selling goods and services in several countries right from their creation or shortly after being born (Gabrielsson and Kirpalani, 2012). In fact, startups have the advantage of adopting cloud technology as early as their creation, thus avoiding risks typically related to a change of ICT systems (abandonment of old technologies, change, and consequent new learning) and to the integration of cloud technologies within previous ICT systems (Ross and Blumenstein, 2015).

#### **4. Research Methodology**

To better analyze why startup firms choose to adopt cloud technologies upon their birth, we conducted a case study of cloud adoption by an Italian technological startup firm.

The use of this method has been widely applied in the field of ICT (Benbasat et al., 1987; Lee, 1989; Mumford et al., 1985; Smith, 1990; Lee, 1991;) although, initially, its application was strictly quantitative (Gable, 1994). Case study research is often performed to aid in understanding a complex issue or phenomenon in which hypotheses are difficult to identify or define before collecting research data (Yin, 1984). This method allows an investigation of the reasons behind individual behaviors and decisions by reducing the lack of information and

highlighting issues that would be lost with other methods (Yin, 1984). What should be noted is that this method is largely used in information technology research (Yang and Tate, 2012). Some authors have shown that case studies allow researchers to study information systems on-site, highlighting the practical aspects (Benbasat et al., 1987) to enhance the replication of a framework (Yin, 1984), to reduce the lack of information, and to enrich a particular field of study (Santos et al., 2004).

The firm chosen for the analysis was selected from the population of cloud-based technology startups recently initiated in Italy. This selection followed certain criteria. First, the firm should have the attributes of scalability and rapid growth (Blank, 2010). Then, the startup investigated should be based in Italy and founded within the last five years; this because in the last five years in Italy, there has been a strong growth of cloud-based technology startups (NuvolaItaliana, 2014). Finally, the founders of the target firm should be new entrepreneurs in order to better analyze the difficulties in creating a new business and to focus on how cloud technologies allow the entrepreneurs to overcome these.

Once the criteria were established, we opted for a firm that appeared to have enough information to facilitate theoretical inference (Santos et al., 2004).

Following the approach by Carroll et al. (2011), in order to better understand the reasons behind the adoption of cloud computing in a startup, we considered as main sources for our analysis the interviews with the three founders of the startup. We then interviewed the cloud provider consultants (as external actors) who assisted the implementation and structure definition process. Finally, to ensure a more complete analysis, we also interviewed some employees as end users of the instrument. The choice of the subjects interviewed allowed us to better analyze the ICT design process using cloud technologies. In some cases, it was possible to interview representatives of the cloud provider to verify the effective exchange of information among the various actors involved in the process. In addition, the analysis takes into account both endogenous and exogenous variables, as we considered both internal (interviews with managers and internal documents) and external sources (reports published by the company, newspaper articles).

The interviews were conducted on the basis of a semi-structured questionnaire built on the framework we chose. The purpose in the preliminary analysis was to obtain information regarding what led enterprises to choose cloud computing: the motivations behind, the expected benefits, the degree of outsourcing, and safety considerations. The questions represent a kind of guideline, as they provided a number of key issues to be discussed during the interviews, rather than representing binding questions to ask the interviewees. The interviews were recorded and then transcribed for analysis. In cases where some issues raised and have been not completely addressed or some interviews resulted partly incomplete, we requested follow-up interviews by telephone.

In order to avoid individual researcher biases potentially influencing and thus altering the results of the study, the interviews were conducted by a team of four researchers, after the key criteria for the interviews had been defined. At least two members of the group were involved in each interview.

During the interviews, several internal documents relating to the ICT function were consulted as well as specific data that may help the researchers recognize the relevance and the cost of the function in order to support and confirm the respondents' answers. Immediately after the interviews, recordings were transcribed by each researcher. Next, the transcriptions were chronologically organized and then discussed by researchers, thus building a summary of the data and opinions regarding the expected benefits, motivations behind the adoption, and actual benefits derived by the adoption of cloud computing.

## **5. A Case Study of an Italian Technological Startup**

Aiming to better understand the business model adopted along with the adoption of cloud computing in the startup phase of a business, we interviewed the three founders of AlphaGame, a startup enterprise in the IT industry. AlphaGame is a startup established in Italy during 2013 with the intent of building up a game aggregator. For a purpose of clarity, a game aggregator is a system that collects games and other kind of gaming software. This system stores games on a website (as a sort of database) and provides to their customers the possibility to use them in every moment.

In few years, AlphaGame has been able to attract a growing community of videogame developers that is increasingly more willing to publish their games on AlphaGame channels. AlphaGame offers a complete, simple, and high-end product both to companies wanting to engage and monetize their user-base and to HTML5 game developers. AlphaGame's database offers more than 15,000 games to more than 250,000 users from 190 different countries, who wish to challenge each other online in different kinds of games, including arcades, sports, puzzles, action, strategic, etc. Within a "win-win" relationship, the system adopted by AlphaGame also allows the

developers to profit by selling their games' licenses or sharing with AlphaGame the earnings coming from advertising.

The following table lists the main business factors characterizing AlphaGame.

Table 1. AlphaGame's main characteristics (source: adapted from DaSilva et al., 2013)

<b>Customer value creation</b>	Free access to a huge numbers of games
<b>Earnings logic</b>	The system allows developers and publishers to share with AlphaGame the earnings coming from advertising
<b>Value network</b>	Developers and publishers as partners (they share earnings without paying fees to develop and upload games and applications)
<b>Resources &amp; capabilities</b>	Scalability, fewer financial resources required
<b>Strategic decisions</b>	The strategic decision, as a startup, has been to choose cloud technology as a business model from the early stages

What should be noted is that the company was founded with less than 20,000 € through the crowdfunding tool. After the first two years, the average growth of the company's total assets was about 63.33%. This high growth rate attracted two of the most important European ICT capital ventures, and this has allowed AlphaGame to increase its investments, consolidating its position in the market.

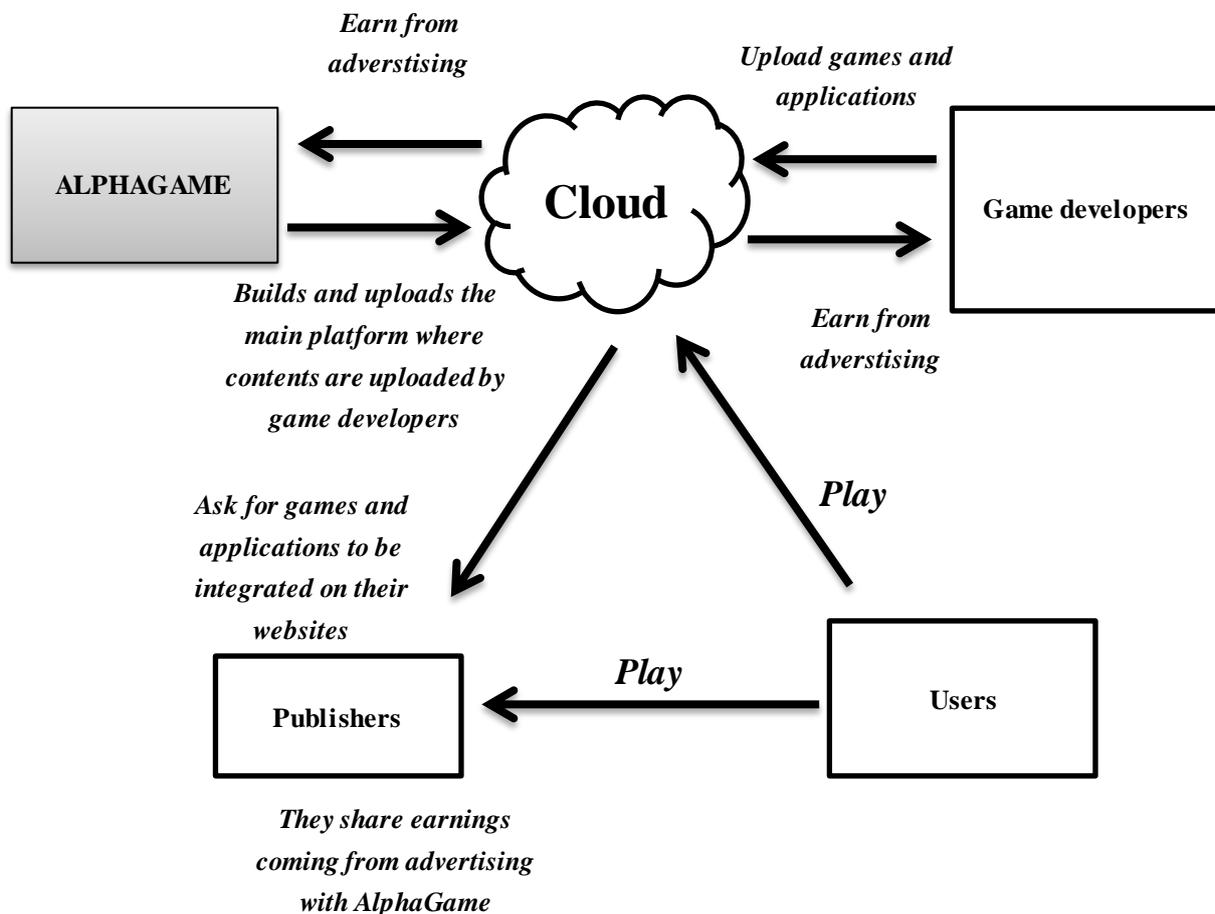


Figure 2. AlphaGame's business model

The founders had had this business idea several years before implementation, but it was not economically feasible due to the high costs of the ICT structure. One of the founders said:

*“This market was hidden by the higher costs [...] we needed a big ICT structure but we did not have enough money”*

With the introduction of cloud technology, the “rules of the game changed completely”. Indeed, after considering the benefits and costs related to the creation of a cloud-based startup, the founders decided to found the base of the new firm on this technology. As first, they ask to different ICT consultant a complete report about benefits provided by this technology to their firm startup. Two reports concluded that the benefits (not only economical

benefits) were greater than the costs, so the management chose to create a cloud structure and built the entire business system on it.

By using the cloud services provided by one of the most important European service provider to develop the main platform on which the contents (games and apps) are uploaded, AlphaGame has been able to support scalability all over the world, and it is estimated that its users will increase by more than 350,000 over the next few years (Microsoft, 2013).

Fundamentally, the developers and users do not care about the fact that the service by AlphaGame is provided through cloud technology. In fact, the developers are interested in earning profit from their games and applications, while the users are interested in playing for free. Moreover, the publishers are interested in the earnings from advertising and also even in seeing an increment of web traffic-stats on their websites/blogs, thanks to the integration of games and applications provided by AlphaGame.

This context allows AlphaGame to solve problems of cost (less investment in ICT), space (less space to dedicate to servers and other instruments) and time (to be ready to operate on the market) (Ross and Blumenstein, 2015). Indeed, generally to perform this kind of activity, firms like AlphaGame require a large space for storage, continuous software updates, and powerful servers to be able to respond to its large audience. Moreover, to satisfy all these needs, firms generally need great financial resources (in addition to a well-detailed, multi-year investment plan), which is often not compatible with the means of a startup.

The company is positioned in a niche market with incredible potential but that has been unexplored until now. During the first interview, one of the founders said that, up to that time, the ratio between expected income and the investments necessary for the company's creation was very low. Therefore, this market was not considered feasible by the founders due to the huge investment. The introduction of cloud technologies changed the market rules, creating something completely new. Indeed, until that time the company's foundation was constrained by a limited availability of capital and by a lack of future profitability. With the introduction of cloud computing, a feasible opportunity emerged. Due to technological progress and the feasibility for investment, the only risk highlighted by the founders was to remain isolated from the cloud provider.

*"Being isolated from the cloud provider would mean not having the opportunity to work and to conduct our business."*

Despite this risk, the founders decided to implement cloud computing right from the first day of activity, because they had great expectations regarding the perceived benefits coming from its adoption.

*"To choose the best cloud provider, we considered different factors like the duration of activity in the sector, the size of the provider, and the compatibility of the software provided with those already known by the employees."*

After this analysis, the founders opted for the adoption of Cloud Azure. The time period between the signing of the service contract and the service activation was just a few working days (three or four in total). What should be noted is that the implementation phase did not required considerable effort. In a new work environment, one that is inclined to learning and with no set routine, the implementation of an innovative tool is usually simple.

With reference to Ross and Blumenstein's framework (2015), we will discuss each attribute.

The first attribute to discuss is *"increased global collaboration."* Introducing cloud computing right from the early stage of the startup provided a strong degree of technological innovation and high-quality service. In fact, thanks to the rapidity in exchanging data, AlphaGame is able to provide its service to a great number of customers, especially thanks to cloud servers that support a strong demand. As a result, some of the major market players (such as Nokia and Kaspersky Lab) started a collaboration with the startup.

The second attribute to discuss is the *"reduction of the opportunity cost."* The CEO of the company revealed that cloud computing was not only chosen for lack of initial capital but also for the possibility of creating scales of economy. This factor is one of the main benefits resulting from the adoption of this technology. In fact, it is extensively discussed in the literature about SMEs (Buyya et al., 2008; Armbroust et al., 2009; Marston et al., 2011), but it is not analyzed in the literature about startups (Ross and Blumenstein, 2015). To support our statement, the following quote expresses the opinion of one of the founders:

*"We needed scalability and ease of use [...] because we cannot change servers every month, and we cannot spend a large amount of money on hiring and training. [...] Also, we did not have to migrate from our servers to cloud servers, because we used the Cloud right from the first day. We saved the money that we would have to spend for a technical department."*

In the startup company, the main disadvantage identified by the founder was not a problem, because there was no

routine to recreate or activities to be redrawn. This statement shows that the main perceived risk arising from the adoption of cloud computing (ICT organizational change) (ENISA, 2009; Khajeh-Hosseini et al. 2010; Dahbur and Tarakji 2011; COSO 2012; Caldarelli et al. 2016) has no any importance within startups. Another aspect to highlight is that the main expected benefit coming from the adoption of cloud computing was the saving of financial resources. Regarding this issue, the founders stated that, in a startup company, low investments in infrastructure provide more flexibility and agility and help the founders to focus on the core business. In fact, the CEO had the possibility of shifting the financial and human resources from the ICT infrastructure management to the core business saving money and improving the efficiency. Moreover, costs were constantly monitored thanks to the cloud management panel provided by Cloud Azure. What should be noted is that the cost savings mainly concern the costs of employees and of server management, because these activities are outsourced to the cloud provider. All the interviewed subjects stated that the investments in infrastructure to provide the same level of basic service would have been the equivalent of about five years of subscription to a cloud computing service.

The third aspect to discuss is “scalability”. Using cloud services for Azure Server to develop the videogame distribution platform, AlphaGame had a server system that guaranteed scalability worldwide and the capacity for more than 200,000 users. The company negotiated with the provider a clause that guarantees the continuous updating of the cloud platform in order to automatically handle a sudden increase of users. These service updates occur according to customer requests. In this regard, one of the consultants said:

*"The business was set from the beginning to the cloud, this guaranteed agility and eliminated all the typical problems of the migration process."*

From the interviews with the founders it became clear that the service scalability allowed the firm to operate in full business continuity in the early years of its life without having to worry about changing servers or storage.

*"In the early stages of our business, we saw the service demand growing rapidly in just a few months [...] if we had implemented a traditional ICT structure, we would have had to change it or upgrade it after only a few months, and this would have created an economic and financial imbalance. In addition, we would not have had the time to train the personnel [...] training or recruitment would have required us to shift the focus from the core business to the ICT function."*

The fourth aspect to discuss is “access to the global market.” The success of AlphaGame is due to the foresight of its founders, which identified the need to expand the business activities outside the Italian market. In fact, the three founders knew well that this particular business could easily be adapted to an international target. Great effort was devoted to creating a flexible structure that could provide an appropriate service level for worldwide customers. Right from the early stage, cloud technologies allowed the use of servers with a guaranteed connectivity of up to two Gbit/s to support an average monthly traffic of one million customers, ensuring the same quality of service to foreign users.

Finally, the last attribute to analyze is “access to international venture capital.” This attribute can be critical for startup firms, especially in those countries (such as Italy) where forms of financing such as venture capital or crowdfunding are scarcely used. However, it should be noted that the use of cloud computing allows companies a greater level of visibility. AlphaGame managed to secure considerable funding through crowdfunding and scale-up platforms, through which it has been able to raise the necessary capital to first survive and then to make the firm grow. One of the venture capitalists stated

*"From this point of view to operate in the cloud is like a business card [...] We have a guarantee regarding the innovation and quality of the online service in every field of business."*

The introduction of cloud technologies led to a simplification of contract related to the drastic reduction in the costs of starting new companies in technology sectors.

## **6. Discussion and Conclusion**

The aim of this paper was to understand the economic and organizational contribution that cloud computing provides to startup firms. To do this, we developed a case study by analyzing a technology startup. The work was built on the theoretical framework by Ross and Blumenstein (2015), which identified five main effects of cloud computing: increased opportunity, reduced opportunity costs, scalability, access to global markets, and access to international venture capital.

This study enriches the literature on cloud computing, and it has some managerial implications.

The results show that without cloud technology, the firm’s founders would not have had the possibility of starting the business activities because of scarce initial financial resources to invest.

This allows us to highlight two key points. First, in accordance with the framework by Ross and Blumenstein (2015), cloud computing is a tool that can increase business opportunities by eliminating several entry barriers in different markets. This allows firms to be “born global” and to develop high growth rates. Second, our results confirm what the findings of Etro (2009), Sultan (2011), and Lawler et al. (2012) regarding organizational and economic improvement. In fact, cloud technologies can significantly improve the organizational and economic efficiency of enterprises, reducing the costs of employees and investments in servers and thus increasing the flexibility and agility of the business. Moreover, thanks to the high degree of scalability, cost savings, and reduced opportunity costs, cloud computing made the possibility of expensive servers affordable, confirming what has been claimed by many authors (e.g., Armbrust et al., 2010; Khajeh-Hosseini et al., 2010). Besides low investments in hardware and software, cloud computing has several other advantages for startup firms, such as scalability, ease of use, and flexibility. This is partially in agreement with what has been evidenced by certain authors in other SME fields (Lawler et al., 2012; Brender and Markov, 2013; Gupta et al., 2013), with the difference that, within startup firms, some advantages are amplified because of adoption right from the early stage. Despite the multitude of the interviewed subjects, the main perceived benefits coming from cloud adoption are the same regardless of the interviewee’s level of education, experience, and position in the company.

Our results also show that building the business model entirely on cloud technologies could simplify and reduce the growth period for startup firms. Thus, this paper illustrates how cloud computing can help startup firms solve some of the typical organizational problems related to ICT implementation in SMEs. In addition, our results show that a cloud-based startup, thanks to the flexibility guaranteed by this tool, has more possibilities to access new funding forms, such as venture capital or angel investors. Finally, our paper highlights that the introduction of this technology in startup firms represents a process completely different than that in going-concern firms. In fact, a new company does not yet have internal dynamics that need to be taken into account during the implementation steps; thus, there will not be resistance to a change in the business routing. Therefore, building up the organizational structure on cloud technologies makes both the first organizational design phase and the subsequent implementation process go smoother.

As with any new technology, cloud computing has a dark side: as previous literature has highlighted, several issues can arise from cloud implementation (e.g., loss of governance, loss of sensitive information, and increase in risk control and all the typical risks related to outsourcing and sharing). In addition, what should be highlighted in terms of startup firms is that the main perceived disadvantage is the isolation from cloud providers. The rationality behind this perception can be found in how cloud computing works: because this technology only works when connected to the Internet, an organizational model entirely based on this technology, such as a cloud-based startup, will always be connected to the risk of isolation from the Internet and from the provider, which, in turn, would create the impossibility to operate.

This study has several implications for practitioners and academics. With reference to practitioners, the results of this study shed into light some important issues related to cloud usage by technological startups that have not been addressed by previous studies. First of all, we found that cloud computing helps startup in opening new market opportunities. This implies that the main benefit provided by this technology to firms is not (only) the economical one (i.e. money savings) but it also allow to take new market opportunities, to gain a competitive advantage or to shift attention on others activities. For example, using cloud-computing startupper can focus on firm promotion, on customers’ activities, or on organization development. This finding is particularly important for ICT managers or for CEOs as they decide how to allocate resources. This study suggests that cloud computing can be an important ally for startup strategy definition. Secondly, we put into light the decisional process about cloud implementation and which are the main issues/motivations of startups. This finding can help cloud providers in understanding startup needs in order to focus the offer of service.

With reference to the contribution for academics, to the best of our knowledge, this research provides a more in-depth study of a startup firm and its use of cloud technologies than other study to date. The Ross and Blumenstein model (2015) has been theorized and empirically used in this work.

However, this study is affected by the typical limitations of case studies (Yin, 1984). Our work is limited to a single firm and therefore cannot be generalized to all startup firms. With this kind of study, we can only took a snapshot of a firm. However, a quantitative analysis could be employed collecting results from questionnaire or by using a longitudinal study to obtain more generalizable data. In future, using quantitative methodology, we could investigate different effect of cloud adoption on startup firms making comparisons (geographical or dividing firms for different activities) thus providing more insight into the phenomenon of cloud computing adoption for startups.

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