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DETERMINANTS OF ADOPTION OF CLOUD COMPUTING SERVICES BY SMALL, MEDIUM AND LARGE COMPANIES

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ABSTRACT

Manufacturing sector organizations have seen an improvement in their competitiveness due to the digital economy. However, there must be a steady migration from an organization with a restricted use of Information Technology, to one in which Information Technology is commonly used for all of the different activities of the company. Based on this migration, organizations of all types can generate increases in productivity and competitiveness. This in turn contributes to advances in progress and welfare by creating more opportunities.

This study proposes to advance knowledge about the implementation of cloud technology so that an organization can become more competitive. The current technology available for improving competitiveness in all areas of a company by exploiting data, providing services and for the use of resources, is cloud computing. This novel technology will be investigated and the findings will be used to describe the state of this technology in our country at the moment. It will also show how the complexity of these systems and the attitudes of the organizations and people involved, depending on the size of the organization and its management style, influence the adoption of cloud computing systems.

Keywords: *Cloud Computing, Adoption, Technological Complexity, Attitude Towards The System.*

1. INTRODUCTION

The concept of cloud computing has become, over time, a common and popular term, to which is associated the global use of a computer network, which is linked to a massive number of physical or virtual servers called "cloud" [1]. For the United States of America National Institute of Standards and Technology (NIST), cloud-computing is a model for enabling access to a set of computing services (networks, servers, storage, applications and services) conveniently and on demand, which can be quickly provided with minimal administrative effort and interaction with the service provider [2,3]

[4] describes it as "distributed computer groups (usually data centers and server farms) that provide on-demand resources and services over a network (usually the Internet)". These servers can be used by multiple users, whether these people or companies. In this scenario, software is seen as a service that is provided at a low cost and a large amount of users. By placing all of their services in the cloud, users will reduce their total IT cost [5, 6, 7]. Cloud computing solutions thus offer monetary benefits that businesses cannot ignore.

Cloud computing solutions give enterprises and users easy access to computing potential [8]. The concept of cloud computing is often used to indicate a new model or technology, which in a flexible way provides IT resources and services over the internet [9] and is based on a set of virtualized, easily usable and flexible resources [10]. These features are dynamically reconfigured to a variable load that allows their optimal use.

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Also, cloud computing are "computing services from anywhere, using any mobile device with Internet connection, provided by a type of parallel system and distributed on virtual computers that are interconnected and can be provisioned dynamically. It is presented as one or more unified computing resources based on the Service Level Agreements (SLAs) that are established between the service provider and the user" [11].

Possible benefits of adopting cloud computing in organizations are ease-of-use, convenience, on-demand access, flexibility, and least management from the users [12]. Cloud Computing offers many opportunities and could help companies to improve their business and use technology more efficiently [13].

The objective of this research has been to know the factors which can influence, notoriously, the size of the organization measured in terms of sales volume.

This will be done by grouping and then studying organizations in Spain, in order to obtain classifications and results where this type of approach and these types of results are innovative.

It will, also, show how the complexity of these systems and the attitudes of the organizations and people involved, depending on the size of the organization and its management style, influence the adoption of cloud computing systems.

The combination of the results above for organizations in Spain is an innovative approach to provide any systems designer in Spain with novel, specific results for Spain, that allow the possibility of incorporating best practices for the adoption of cloudcomputing in any Spanish organization of any size. In this way the system designer and organizations will have results which are specific to the situation in Spain, in contrast to having to use results from other countries.

In order to obtain information which allows us to provide useful information about tha deployment and acceptance of cloudcomputing in an organization, the following questions have been addressed:

1. What values should be taken into account to classify the size of an organization for this study?
2. How do the attitudes of an organizations members to the cloudcomputing system influence the acceptance of cloudcomputing in relation to the size of an organization?
3. How does the Technological Complexity of a cloudcomputing system influence the acceptance of cloudcomputing in an organization in relation to the size of an organization?
4. How does the Intention to Use the cloudcomputing system by members of an organization influence the acceptance of cloudcomputing in an organization in relation to the size of an organization?

Although the advantages and possibilities of cloudcomputing have been recognized and studied in many situations, there has been a need for more practical analysis of the lack of uptake of the technology in the business structure in Spain. This study will address practical considerations for the successful implementation and acceptance of a new technology by the employees and users of a cloudcomputing system in Spain.

This paper is organized as follows. Section 2 analyzes essential characteristics, models for providing cloud services, added value of cloud computing, and benefits and difficulties for the company. Section 3 presents research methodology (sample and data). Section 4 presents results, and Section 5 concludes this paper.

2. CONCEPTUAL FRAMEWORK

2.1 Essential characteristics of cloud computing

Cloud-computing is built around a model based on five main characteristics [2], each which can also be considered as benefits:

- ✓ Self-service based on demand: This feature consists of the user making requests for service on the Internet. The services are invoiced exclusively for the time that the service is used. With this feature, or benefit, the customer or the user does not need to interact directly with technicians.
- ✓ Omnipresent access: The set of resources and services offered by cloud-computing is available to users. Its ubiquitous or omnipresent character is due to it being multiplatform and that it can be accessed from any networking point. This means that the media is truly independent for a multitude of clients with various characteristics and different profiles.
- ✓ Communal repository of resources or multiple resource ownership: The cloud model is characterized by being a set of dispersed resources which are replicated internationally

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using accessibility and proximity criteria, meaning that these can be provided to a multitude of customers who share them on a communal basis. This model makes use of the independence of the site and uses dynamic allocation of services and resources, whether physical or virtual, depending on the needs of users.

- ✓ Dynamic elasticity: The services offered in the cloud, their quality and quantity will decrease or increase rapidly according to the real time needs of the users. This is both dynamic and elastic at the same time. Allocations of the resources and systems can be made by scaling the systems (i.e. towards more powerful computing) or by adjusting the number of systems (towards a greater number of processors in parallel). The assignments can be defined automatically or by a technician.
- ✓ Measurable nature of the service: This characteristic conveys the cloud services an attribute of "commodities", that is to say, of the raw materials or basic products markets, which are decentralized and where non-manufactured and generic products are traded indifferently. This comparison is based on the measurable character of the amount of storage, the number of transactions, the bandwidth, the memory or the number of cores. These measurable factors are the basis of the billing to the customer for the time and quantity of services used, initially without any great differences.

2.2 Models for providing cloud services

Existing models can be firstly classified by the way services are delivered. This criterion divides into three types:

• Software-as-a-Service (SaaS): In this model, applications are distributed over the Internet, as a service. Therefore, such applications can be accessed, rather than having to install and maintain the software. As a result, customers can free themselves from the complexities of software and hardware [4].

This type of Cloud services offers complete application functionality, ranging from productivity applications (e.g. word processors, spreadsheets, ...) to programs such as Customer Relationship Management (CRM) or Enterprise Resource Management (ERM).

• Platform-as-a-Service (PaaS): provides the customer with an environment of applications that interact with others stored in the cloud [14].

This model is usually used by companies subscribe services immediately and at a low cost, with the objective of develop their applications and programs on a platform.

• Infrastructure-as-a-service (IaaS): provides the customer with storage capacity required for the user use your files and programs. In this model, the supplier only infrastructure that the customer needs, and can increase or reducing it through their needs [10].

Each type of service has different objectives and focuses on different clients. However, they all share a common business model that is the leasing of the use of computing resources, including services, applications, infrastructures and platforms by customers.

2.3 Added Value of cloud-computing

When considering the added value of cloud-computing, we can identify various cloud-computing technology adoption catalysts [15]:

- ✓ Outsourcing of services: The need to outsource certain services that do not need to be carried out within the organization undoubtedly drive the cloud, since for certain applications, one of the conditions is that an external services company specialized in cloud or in cloud services will provide the service.
- ✓ More efficient services in less time: The cloud-computing services business sector is accustomed to carrying out software and services projects with greater efficiency in less time. This can be seen in terms of storage capacity, in computing capacity or in terms of availability.
- ✓ The omnipresent nature: This catalyst is the base of ubiquity, meaning that it is always there, i.e. available from any network access point at any time. This gives organizations the ability to work from anywhere in the world connected to the Internet and also a multiplatform character, that is to say from a tablet, a smart-phone or a personal computer.
- ✓ Economic savings: This reason promotes the technology from the mere fact of cost savings using shared resources.
- ✓ Virtualization: This is one of the strongest forces that have undoubtedly helped cloud technology reach the level of efficiency with which it is seen and used today by countless organizations around the world. Virtualization technology or software is the major player in achieving the objectives of resource allocation for customers who share the same cloud

service provider. Virtualization allows this same assignment to be dynamic, elastic and hugely effective, without too much latency.

According to [16], "cloud-computing has provided new possibilities for building and deploying computing infrastructures and complex services using virtualization." For [17], another advantage of cloud technology is that it can be accessed on demand and used anywhere, at any time, by hiding the complexities of the base infrastructure from the end user.

However, not everything is positive as there are also real barriers for this technology. Some of the identified barriers, which undoubtedly pose a challenge to the adoption of cloud-computing [15], are described below:

- ✓ Security: This is one of the biggest barriers to the expansion of cloud-computing. This means the important characteristics that the cloud holds when compared to 'housing' (having servers in the organizations own facilities) are not fully understood and therefore the 'housing' concept still has many followers.
- ✓ Privacy: The perception of cloud-computing by users creates this barrier. Many customers and users do not trust cloud-computing. This distrust exists mainly due to the lack of knowledge about the data encryption that is used or because the organization itself uses the cloud as a means of storage without using any privacy policy.
- ✓ Legislation: Hiring cloud services means that your data can be physically stored in one or more points in the world. This decentralization is also subject to the legislation of the country where the hardware resources are located or the physical center or data center itself. The user's perception of the legislation of other countries depends a lot on the name of the country or its prestige, but the lack of knowledge of the function of replicating the data in several data centers to obtain better yields, means that the user perceives negatively this fact in view of the laws that there may be for intellectual property, privacy and security of personal data.
- ✓ Restrictions: This refers to data traffic in the network itself, since information is delayed by passing through each node, with some real high-speed information highways existing, but also with other restrictive crossings and jams which are very damaging to the expansion of cloud technology.
- ✓ Control of information: It is indisputable that this barrier exists. Every user sacrifices control over the data whilst gaining the other advantages we have already seen. However, such a waiver for the benefit of the cloud provider does not have to mean that the data is not secure and controlled. In fact, not seeing or being able to access the servers does not have to mean lack of control, although it seems obvious that responsibility always lies with the provider.

If any type of problem exists we would be seriously affected in such essential aspects such as the loss of or the integrity of our data. There are authors who systematically detract from such arguments, explaining that the user or client waives a right that makes them truly dependent on the service provider [18]. In this situation, the best recommendation seems to be to establish agreements or contracts based on SLA's or Service Level Agreements that detail how much the user loses control.

2.4 Benefits and difficulties for the company

As we have seen so far, the potential benefits of adopting cloud computing can be evaluated both in terms of financial savings and improvements in the management of computing resources. An obvious financial benefit of cloud-computing, especially for small and medium-sized businesses, is the savings they make from not having to buy and maintain their own hardware and software infrastructures [19].

The significant reduction in capital investment in hardware and software infrastructures in favor of contracting services in the cloud, offers companies the opportunity to acquire technological capabilities that they may not have been able to offer in the past [20].

Universal access to software services (SaaS) can also bring financial benefits by not having to pay for the software in terms of licensing fees.

The elasticity of services in the cloud also means more flexible management of resources, which can also lead to cost savings. That is, companies that provide their services using the cloud can expand and scale the capacity of demand, paying only for actual use.

PaaS provides an agile development environment that makes it easier for ICT professionals to rapidly develop applications and adopt them instantly, since it eliminates the wait for the deployment of the right hardware and software for the applications [21, 22].

In short, cloud-computing enables enterprises, particularly SMEs and consumers, to access resources that could be colloquially defined as "chosen on demand", benefiting from greater flexibility and lower management of computer resources.

But not all are benefits for the company, because despite the promise of technological advance by using cloud services, there are also obstacles to its growth and adoption. The constant lack of high-speed Internet and connections is a major hurdle for cloud computing as it relies on the Internet to offer its services [19].

The lack of standardization of application program interfaces and technology platforms means that platform interoperability is poor and companies will not be able to easily transfer data from one cloud provider to another.

Companies are therefore faced with “lock-in” to data providers. This perception of lack of control may discourage enterprises from initiating the adoption of cloud computing [23].

Companies may also be concerned that their activities and processes, on a daily basis, are controlled, not by their own staff, but by outsourced technicians operating outside their headquarters, as the data is in the cloud provider, and that they may not be able to make the necessary changes to the application with ease and when needed [19, 24].

Concern for security, in particular, combines privacy and data confidentiality, which is one of the most cited objections to cloud-computing [23, 25].

It is argued that most security and privacy issues in cloud computing are due to lack of control over physical infrastructure.

In other words, companies do not trust those who control and monitor the data center in the cloud.

These difficulties result in a series of risks derived from the use of cloud computing, which can be grouped into four categories [27]:

- Political and organizational risks: for example, distrust of cloud providers due to the possibility of blocking data or loss of governance
- Technical risks: such as data loss or leakage
- Legal risks: including data and software licenses protection
- Nonspecific risks of the cloud, but of the infrastructure on which it is dependent, such as network problems or electricity supply.

The uncertainty of service availability and reliability, especially concerning system downtime after an unexpected outage, could deter companies from adopting cloud-computing, as this would increase project costs and business risks.

The knowledge and skills of ICT professionals are an essential factor to take into account and as a consequence, their ongoing training is an important challenge [26, 27].

Therefore, the fact that companies have relevant ICT professionals to manage the cloud-computing processes and services is an issue that generates important concern.

3. METHODOLOGY

3.1 Sample

The 615 companies that make up the sample for our study have been obtained by contacting business organizations in the sector, with the Chambers of Commerce of Andalusia and with ANDCE, Association of Entrepreneurs of Electronic Commerce of Andalusia. In all cases, the profile sought is that of companies that use cloud-computing as a strategic component for the development of their operations in Andalusia.

The list of companies participating in the initiative launched in summer 2014 by state-owned Red.es for Andalusia, which aimed to encourage the migration and development of business solutions in the cloud by the SMEs and self-employed in Andalusia, was also used. Once the census of companies and organizations that are part of the population under study was made, all members of the sample were contacted. From this census, 161 companies completed the questionnaire, obtaining a final figure of 150 valid.

The quantitative technique of investigation that was used was a survey, provided by an online survey, although reinforced with telephone follow-ups. For this, the questions were presented on a website whose link was sent to organizations that constitute the population under study. Regardless of the position held, in all cases the questionnaire was answered by the person with the greatest knowledge of the cloud adoption process within the organization, or directly by the management.

Possible limitations of this study are, Finally only 150 organizations of different sizes were used as a sample. However, this number is representative and can be used for statistical analyses, but, of course, the greater the number of samples the more accurate the results. When carrying out this study it has been assumed that the persons who completed the study is representative of the people who are going to use the system, that they have the same knowledge and interest in using technology. However, these

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assumptions are typical and standard for any analysis with statistical treatment of the results and do not affect the validity of the results or conclusions found.

3.2 Data

Classification variables such as Invoicing and Number of employees of the organizations have been studied.

The questions or items of the surveys have been classified into 3 groups:

- Technological Complexity (TC): the degree to which an innovation is perceived as relatively difficult to understand and use [28]. Some aspects that are often associated with complexity are the degree of difficulty of the skills needed by the employees in order to use the technologies or the difficulty of integrating these technologies into the work [29].
- Attitude towards the System (AS): reflects favorable or unfavorable feelings regarding the use of a certain technology.
- Intention of Use (IU): is the degree of previous behavior that one has when using the technology [30].

Table 1: Items o identifiers. Application of variables

Group	Items	Adapted from
Attitudes to the system	(AS1) The cloud-computing system will provide me with access to most of the data.	[31-35]
	(AS2) The cloud-computing system will be / is better than the previous Information Technology.	
	(AS3) The cloud-computing system will provide accurate information.	
	(AS4) The cloud-computing system will provide integrated, timely and reliable information.	

Group	Items	Adapted from
Complexity of the technology	(CT1) It is difficult to understand what the cloud-computing system does.	[31, 36-39]
	(CT2) It takes me too long to use the cloud-computing system.	
	(CT3) It takes a lot of effort to learn how to use the cloud-computing system.	
	(CT4) In general, the cloud-computing system is complex.	

Group	Items	Adapted from
Intention of use	(IU1) I hope to use the cloud-computing system.	[31, 32, 36, 40-42]
	(IU2) I hope the information from the new cloud-computing system is useful.	

4. RESULTS

The analysis was made based on the turnover of the organization. There are several measures to classify the size of companies into small, medium and large. In the European Union, microenterprises are considered to be 'any entity which carries out an economic activity which occupies less than 10 persons and has a turnover or an annual balance sheet of not more than 2 million euro'. In Spain, according to the Central Business Directory [43], 95.2% of companies fit this profile of micro-enterprise in terms of the number of workers. Also, the numbers of companies that invoice less than 2 million euro constitute 97.4% of the total.

However, in the cloud study conducted by [44] "micro-enterprises" (SOHO, Small Office - Home Office) are considered to be those that have between 1 and 10 employees, "small companies" those that have between 11 and 99 employees and "medium companies" have between 100 and 200 employees. In the present investigation, taking into account the profile of the companies that compose the sample under study, the possible influence of the size of the company will be analyzed as a function of annual turnover of less than or equal to 500000 € per year.

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Table 2: Turnover. Averages and standard deviations.

TURNOVER		AS1	AS2	AS3	AS4	IU1	IU2	CT1	CT2	CT3	CT4
<500000 €	$\bar{x}$	4.76	4.70	4.62	4.69	4.83	4.76	2.06	1.78	1.75	1.78
(N=93)	σ	0.55	0.58	0.72	0.58	0.52	0.55	1.25	1.02	1.08	1.02
500 to 1M €	$\bar{x}$	4.78	4.70	4.78	4.78	4.83	4.83	2.22	1.83	1.87	1.74
(N=23)	σ	0.51	0.55	0.67	0.51	0.49	0.38	1.27	0.98	1.42	0.81
1M to 10M	$\bar{x}$	3.90	4.10	3.80	3.85	4.55	4.35	2.95	2.60	2.40	2.45
€ (N=20)	σ	1.07	0.85	0.89	0.67	0.51	0.67	1.09	1.27	1.14	1.23
10 to 25M €	$\bar{x}$	3.50	4.50	4.00	4.00	4.50	4.50	3.50	2.00	2.50	2.50
(N=2)	σ	0.70	0.70	0.00	0.00	0.70	0.70	0.70	1.41	0.70	0.70
25 to 50 M	$\bar{x}$	4.25	4.00	3.00	4.00	5.00	5.00	2.50	1.25	1.50	1.75
€ (N=4)	σ	0.95	0.81	0.81	0.81	0.0	0.00	1.29	0.50	0.57	0.50
> 50 M €	$\bar{x}$	4.38	4.13	4.00	4.00	4.75	4.50	3.38	2.25	2.88	2.13
(N=8)	σ	0.74	0.83	0.92	0.92	0.46	0.53	1.18	1.03	0.83	0.99
Total	$\bar{x}$	4.60	4.57	4.45	4.53	4.79	4.71	2.31	1.91	1.92	1.89
(N=150)	σ	0.73	0.68	0.84	0.69	0.51	0.56	1.28	1.10	1.15	1.02

In addition to including the Intention of use in the comparative analysis, it has been considered interesting to add two variables that could have a greater relation with the size of the company, precisely because of the difference and complexity of resources that can be managed due to this categorical variable: Attitude towards the system and Technological Complexity. The following are the averages, standard deviations and sizes of the subsamples. In the first case, grouping by the turnover of the organization, we distinguished 6 levels, ranging from less than 500000 € (93 organizations) to more than 50 M € (8 organizations).

Table 3 shows the results of the ANOVA statistic for a factor performed with each of the items as a function of turnover. It also includes the corresponding post hoc analysis in those cases where significant differences are shown.

When the Levene test results show that there are no equal variances, the Games-Howell test is used to obtain more detailed information on the source of the differences. Otherwise the HSD Tukey test is used.

As can be seen, in the case of turnover there are significant differences in all items, apart from CT4 ("in general, the cloud-computing system is very complex to use") and IU1 ("I hope to use the cloud-computing system"). A special case is that of CT3 ("I need a lot of effort to learn how to use the cloud-computing system"): although the ANOVA analysis shows significant differences in the joint comparison of means, the Tukey test paired comparison does not show any pair with significantly different averages. As can be seen, in general, organizations that invoice <500000 and from 500 to 1M € (I) have a significantly higher average than those with a turnover between 1 and 10M (J). Thus, it can be observed that "the cloud system gives access to most data" (AS1), "the cloud-computing system will be / is better than the previous Information Technology" (AS2), "cloud-computing system will provide accurate information" (AS3) or "the cloud-computing system will provide integrated, timely and reliable information" (AS4), present higher averages in smaller organizations.

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Table 3: Number of employees. Average and standard deviations.

N.EM		AS1	AS2	AS3	AS4	IU1	IU2	CT1	CT2	CT3	CT4
<10 Emp (N=76)	$\bar{x}$	4.67	4.62	4.50	4.57	4.79	4.71	2.34	2.04	2.00	2.04
	σ	0.64	0.63	0.79	0.60	0.57	0.60	1.38	1.19	1.22	1.12
10 to 25 Emp (N=36)	$\bar{x}$	4.78	4.75	4.58	4.67	4.83	4.81	1.78	1.64	1.64	1.53
	σ	0.48	0.55	0.84	0.63	0.44	0.40	0.89	0.79	1.01	0.60
25 to 100 Emp (N=23)	$\bar{x}$	4.17	4.35	4.35	4.39	4.78	4.61	2.39	1.70	1.65	1.74
	σ	1.11	0.83	0.83	0.78	0.42	0.65	1.23	1.06	0.98	0.96
100 to 250 Emp (N=3)	$\bar{x}$	4.33	4.33	4.67	4.33	4.33	4.67	3.33	3.00	3.00	3.00
	σ	1.15	0.57	0.57	0.57	0.57	0.57	1.15	2.00	2.00	2.00
> 250 Emp (N=12)	$\bar{x}$	4.50	4.17	3.92	4.17	4.75	4.58	3.25	2.08	2.50	2.08
	σ	0.67	0.83	1.08	0.83	0.45	0.51	1.13	0.99	0.90	0.90
Total (N=150)	$\bar{x}$	4.60	4.57	4.45	4.53	4.79	4.71	2.31	1.91	1.92	1.89
	σ	0.73	0.68	0.84	0.69	0.51	0.56	1.28	1.10	1.15	1.02

In the case of technological complexity there are significant differences in CT1 items ("it is difficult to understand what the cloud-computing system does") and CT2 ("using the cloud computing system takes up too much time"). In both cases, companies with a turnover between 1 and 10M have a significantly higher average than those with a turnover below 500000 €.

As for the Intention of Use, companies with a turnover between 25 and 50M have an average significantly higher than those with a turnover of less than € 500,000 and from 1 to 10M in item IU2 ("I hope the information of the new cloud-computing system is useful").

Tables 4 and 5 show, respectively, the descriptions and the results of the single factor ANOVA statistic made with each of the items as a function of the number of workers.

As can be seen, the ANOVA results only show significant differences in AS1, AS2, CT1 and CT4, but when applying the corresponding post hoc tests, it is only possible to find pairs with significantly statistical differences in the case of CT1 ("it is difficult to understand what the cloud-computing system does"). In this particular case, companies with more than 250 workers have a significantly higher average than those with 10 to 25 workers.

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Table 4: Single factor Anova – Yearly turnover.

Items / Depend. variable	ANOVA	Test Levene	Comparison with		Dif. in averages	Post Hoc		
			(I)	(J)		Test	Standard Error	Sig.
AS1	F=7.407 Sig.=0.000	F=2.886 Sig.=	<50000	1M to	0.863	Games - Howell	0.246	0.02
			500 to 1M €	1M to 10M €	0.883		0.263	0.026
AS2	F=4.454 Sig.=0.001	F=1.997 Sig.=	<50000	1M to	0.599	HSD Tukey	0.159	0.00
			500 to 1M €	1M to 10M €	0.596		0.197	0.034
AS3	F=8.622 Sig.=0.000	F=2.153 Sig.= 0.063	<50000	1M to	0.824	HSD Tukey	0.185	0.00
			<500000 €	25 to 50M €	1.624		0.383	0.001
			500 to 1M €	1M to 10M €	0.983		0.229	0.000
			500 to 1M €	25 to 50M €	1.783		0.406	0.000
AS4	F=8.983 Sig.=0.000	F=1.971 Sig.= 0.086	<50000	1M to	0.838	HSD Tukey	0.152	0.00
			<500000 €	>50 €	0.688		0.227	0.033
			500 to 1M €	1M to 10M €	0.933		0.188	0.000
			500 to 1M €	>50 €	0.783		0.252	0.028
CT1	F=3.411 Sig.=	F=0.285	1M to 10M €	<500000 €	0.885	HSD Tukey	0.305	0.047
CT2	F=2.368 Sig.=0.04	F=0.695	1M to 10M €	<500000 €	0.815	HSD Tukey	0.266	0.031
CT3	F=2.508 Sig.=0.033	F=1.216 Sig.=	-	-	-	HSD Tukey	-	-
CT4	F=1.777 Sig.=0.121	F=0.977 Sig.= 0.434	-	-	-	-	-	-

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IU1	F=1.284 Sig.= 0.274	F=1.627 Sig.=	-	-	-	-	-	-
IU2	F=2.632 Sig.=0.026	F=2.766 Sig.= 0.020	25 to 50M €	<500000 €	0.237	Games - Howell	0.058	0.001
			25 to 50M €	1M to 10M €	0.650		0.150	0.004

Table 5: Single factor Anova – Number of employees

Items / Depend. variables	ANOVA	Test Levene	Comparisons with significant differences		Dif. in average (I-J)	Post Hoc		
			(I)	(J)		Test	Standard Error	Sig.
AS1	F=2.955 Sig.=**0.022**	F=5.471 Sig.= 0.000	-	-	-	Games-Howell	-	-
AS2	F=2.595 Sig.=**0.039**	F=3.685 Sig.= 0.007	-	-	-	Games-Howell	-	-
AS3	F=1.667 Sig.= 0.161	F=1.391 Sig.= 0.240	-	-	-	-	-	-
AS4	F=1.541 Sig.= 0.193	F=1.493 Sig.= 0.207	-	-	-	-	-	-
CT1	F=3.952 Sig.=**0.004**	F=3.155 Sig.= 0.016	>250 Emp	10 a 25 Emp	1.472	Games-Howell	0.361	**0.007**
CT2	F=1.865 Sig.=0.120	F=1.122 Sig.= 0.349	-	-	-	-	-	-
CT3	F=2.433 Sig.=0.050	F=0.800 Sig.= 0.527	-	-	-	-	-	-
CT4	F=2.768 Sig.=**0.030**	F=2.075 Sig.= 0.087	-	-	-	HSD Tukey	-	-
IU1	F=0.671 Sig.= 0.613	F=0.261 Sig.= 0.903	-	-	-	-	-	-
IU2	F=0.596 Sig.= 0.666	F=1.804 Sig.= 0.131	-	-	-	-	-	-

It can be seen that there is a reasonable amount of agreement with the results of other studies which have focused on similar, but different analyses with other technological systems in different countries throughout the world.

The present knowledge about the determinants of the adoption of adoption of cloudcomputing

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services by different sized companies in Spain can be seen to have been broadened and added to by this study. With the knowledge gained it will be possible to plan and assure the use of the implementation of cloudcomputing systems in different sized organizations.

5. CONCLUSIONS

The technological complexity resulting from the adoption of the cloud is negatively associated with the intention to use it. This result agrees with the conclusions obtained by [45] and, within the specific domain of the cloud, by the study of [46]. This implies that, although cloud systems are perceived as useful and easy to use by organizations, their implementation may entail certain technological challenges that some companies cannot cope with, such as the need for ICT specialists or the technical requirements for the protection of processes and data.

These results agree with the "Challenges and Opportunities of Cloud Computing" Report [48], which analyzed the situation and impact of cloud-computing in Spain, identifying growth opportunities and adoption strategies for this type of technology model, with special attention to the Spanish SME.

Analyzing the report, 45.2% of Spanish SMEs with webs know about cloud-computing. 20.5% acknowledge having a solid knowledge of cloud-computing solutions and its application in the company, and 24.7% have "heard about" the technology, are familiar with some examples but do not know about it in detail. In contrast, 54.9% of SMEs say they do not know the technology at all. Three quarters (77.5%) of companies are aware of the existence of the cloud, but have never used solutions based on cloud-computing.

The results obtained in our research corroborate this study and reveal this ignorance and, how the influence of Technological Complexity in the Intention to Use is weak and inverse, meaning that when more complex, the Intention to Use the cloud descends, although it does so very slightly. The present work shows that technological complexity is also a mediator to take into account in this new technology and largely explains the intention of adoption.

Finally, with regard to this variable, it should be remembered that, in all the surveyed organizations, the questionnaire was answered by the person with the greatest knowledge of the process of cloud adoption or directly by the management.

For them, the question of whether it is difficult to understand what the cloud-computing system does, highlighted in the comparative analysis that managers perceive greater technological complexity in cloud systems compared to non-managerial technicians. This shows that the management and the midlevel employees have a greater need for time and effort in order to learn about cloud-computing, compared to the technical staff. This fact can be explained by the tasks of the manager, more alien, so to speak, to the frequent use of technology.

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