

CLOUD COMPUTING SERVICE AS A DRIVING FORCE FOR CORPORATE INNOVATION

Zoltán Nagymáté
PhD student
University of Miskolc

ABSTRACT

Cloud computing services provide many opportunities for companies by offering not only economic benefits but also new innovation capabilities. I will examine this new type of IT solution, starting with the clarification of the concept, according to which it is a new service where the customer has access to IT devices via Internet network without major investment. Then I present the potential economic possibilities in cloud computing and also its impact on the overall economy in connection with the model's appearance. Finally, I explore the specific features of the particular areas' use in case of Hungarian enterprises.

1. THE CONCEPT AND CHARACTERISTICS OF THE USE OF CLOUD COMPUTING

Cloud computing is the latest milestone of the information technology's evolution that entirely changed the industry. Cloud computing service is an innovative network-based distributed IT paradigm that enables us to use centralized computing and storage programs and instruments operated by a third party instead of using local computers [1]. According to the critics of cloud computing services the data stored on the Internet is also a disadvantage of cloud computing, because we do not know exactly where the file is stored and we cannot be assured that the file will always remain intact or unauthorized persons will not have an access to them. Obviously there are safe technologies to solve these problems, the question is more about how much we trust the provider. Compared to other distributed computing paradigms (eg. Grid computing, High Performance Computing (HPC)), a great advantage of cloud computing services is that they provide a much greater interoperability on the Web [1]. Many businesses have already recognized the benefits of cloud computing services, for example in Great Britain according to estimations 90% of businesses use at least one cloud computing service, it must be due to the flexibility, data recovery, decrease in fixed asset expenditure, the automatic software update, more effective cooperation of remote employees, data and device security and environmentally friendly solution [2].

Enterprises use cloud computing to optimize resource usage, to build business models and make market strategies that enables them to develop in order to become more innovative and thus more competitive [3].

This article is based on the results of an extensive research [4] which aims to examine the attitude of Hungarian companies related to cloud computing services. I was personally responsible for an area of this publication, so I would like to examine these results and relationships in this article.

2. EMPIRICAL RESEARCH

My empirical research focuses on the attitudes of Hungarian companies related to cloud computing technology. Below I present the research objectives, hypothesis, research methodology and the results of the research.

The aim of my research is to survey the cognition of Hungarian small, medium and large businesses related to cloud computing as well as to determine whether the businesses use cloud computing services to perform different tasks (including data analysis, email, email marketing, file storage, file sharing) or whether they plan to use any of them. Before I started my research, I assumed that companies are interested in cloud computing but in Hungary there is a lack of financially strong companies, they struggle with ongoing liquidity problems, so limited money is available for development. My assumption was evidenced at a professional conference where I had the opportunity to outline the topic and the managers of the small businesses confirmed that they were interested in cloud computing services but they did not use nor planned to use them, because conditions were not provided within the organization.

Before carrying out the research I set up the following hypotheses:

- H1: The concept of cloud computing is less known among Hungarian enterprises.
- H2: From the enterprises that are familiar with cloud computing services, few of them apply the services in the fields of data analysis, email, email marketing, file storage and file sharing.

I carried out a survey to assess the use of cloud computing. The questionnaire was filled out by 97 companies in Hungary. The quantitative research was carried out in Evasys system. I studied every company type by size classes, the questionnaires were filled out mostly by managers. Examining the activities of the companies the sample is heterogeneous. I got answers from almost every sector. 19% of respondents work in the field of wholesale and retail trade and repair of motor vehicles. They were followed by agriculture and professional, scientific and technical activities, both of them with 10%. It is worth noting that even accommodation and public administration sectors got 8%. The sample cannot be considered representative, but I have the opportunity to evaluate the results and draw conclusions from them in order to validate the results in the future by using representative large sample and in-depth interviews.

On the one hand, the research was aimed to examine the extent to which Hungarian companies are aware of cloud computing services. Based on my quantitative research it can be concluded that 28% of the Hungarian companies are aware of cloud computing concept, which is rather low, since in the EU this value is higher, for example in Austria is 62% [5].

I was eager to know what Hungarian companies use cloud computing services for. Based on my research, using cloud computing technology for data analysis is not typical among Hungarian companies. Data analysis can be noticed predominantly at

multinational companies that are present in the sample in 22% and there were only three respondents of them that applied cloud computing technology for these activities. The prevalence of cloud computing data analysis is shown in Fig. 1. According to the figure, only 13.7% of companies use cloud computing technology for data analysis.

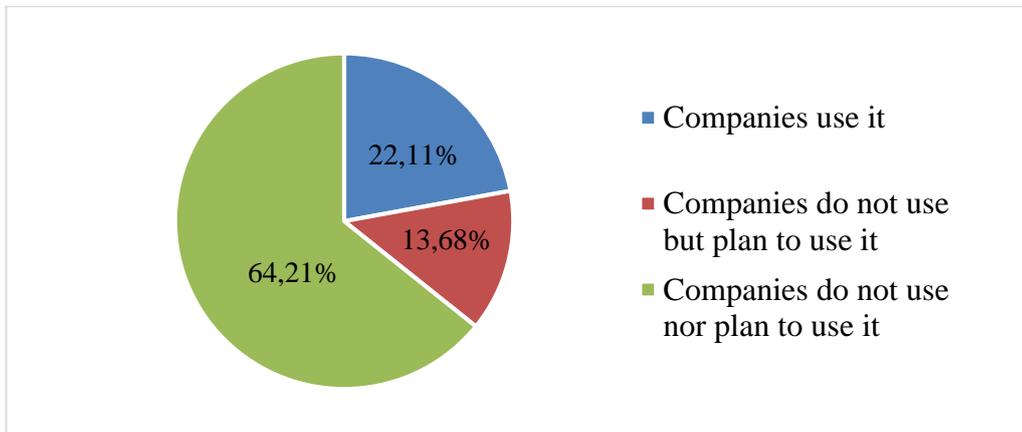


Fig. 1

The prevalence of data analysis based on cloud computing service among the Hungarian companies (Source: own research)

The application of the examined technology enjoys far greater popularity in the field of emailing. Based on my survey, 64% of those enterprises that know cloud computing use cloud computing services for emailing. 70.53% of the respondents use predominantly Gmail, Hotmail and Microsoft Office 365 applications in their correspondence. In this case, the proportion of those who stated that they did not use nor planned to open for this direction is still high. It would have been interesting to point out that those who gave this answer belong to what age groups, because it is likely that business managers representing the older age group have reservations about technological developments even today. The prevalence of cloud computing emailing among Hungarian companies is indicated in Fig. 2.

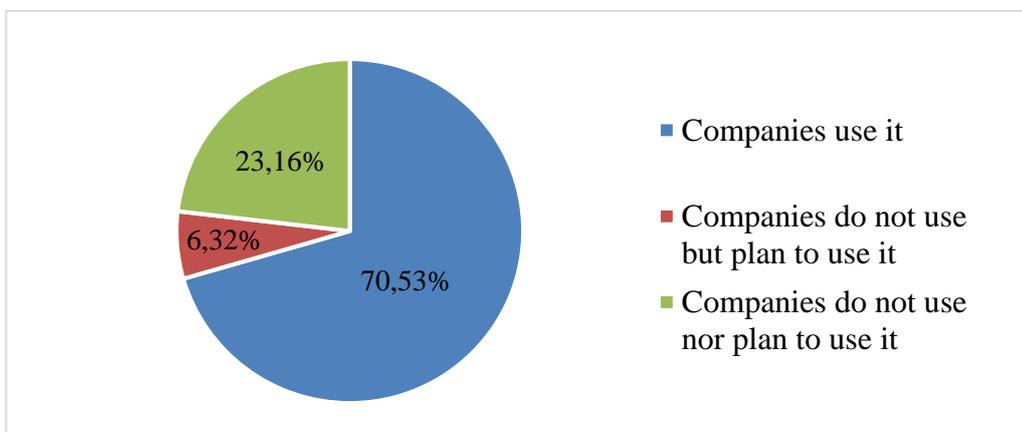


Fig. 2

The prevalence of emailing based on cloud computing service among the Hungarian companies (Source: own research)

In the field of email marketing the most well-known applications are Mail Master and Vertical Response, which were initially newsletter and email marketing softwares, however, as a result of developments they have become maximally serving packages of the company's sales and marketing. Looking at the companies by size categories, it is surprising that from the respondents the micro and small businesses apply (over 13%) and plan to apply (over 14%) cloud computing in a higher proportion the medium and large businesses together. It can be stated also here that overallly the proportion of the respondents who do not use or do not plan to use it is higher in the entire sample (60.87%). The popularity experienced among the micro and small businesses is probably due to the favorable price of the service but its validation requires additional studies.

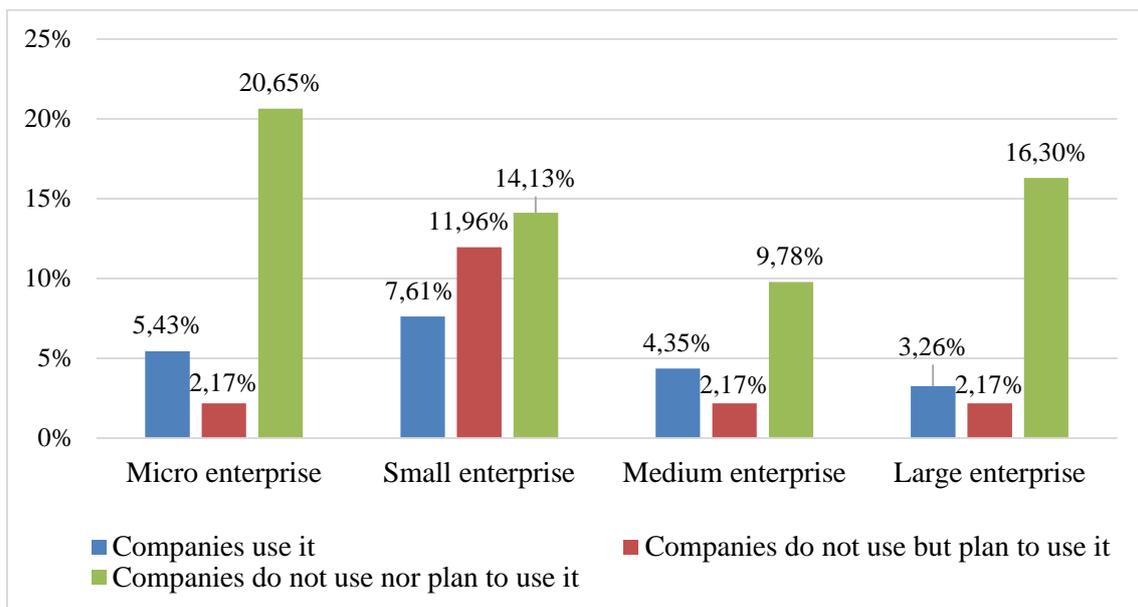


Fig. 3

The prevalence of email marketing based on cloud computing service among the Hungarian companies (Source: own research)

We can state that after emailing the second best-known and most widely used cloud computing technology according to respondents is file storage and file sharing, since at this question there is significantly higher percentage of the respondents who have used or plan to use it (57.61%), more than those who do not use nor plan to use it (42.39%). Such applications can be OneDrive, Dropbox and Microsoft Office 365. The results are distorted by the fact that more than half of the respondents carry out their activities in the Northern Hungarian region.

Fig. 4 shows that the use of file storage and file sharing applications are the most common at enterprises engaged in wholesale and retail trade and repair of motor vehicles activities. Also common sectors are agriculture, forestry, fishing and accommodation and food service activities as well as companies engaged in financial and insurance activities. In case of companies engaged in public administration and defence the use of cloud computing is not typical and they do not plan to use it at all. The opinion of enterprises operating in the field of wholesale and retail trade and

repair of motor vehicles was diverse because in this area many businesses rejected the cloud computing technology, while previous results showed that they were opened to it. According to the research businesses engaged in professional, scientific and technical activities are not opened to it. Several companies plan its introduction in the field of construction industry, agriculture, forestry and fishing.

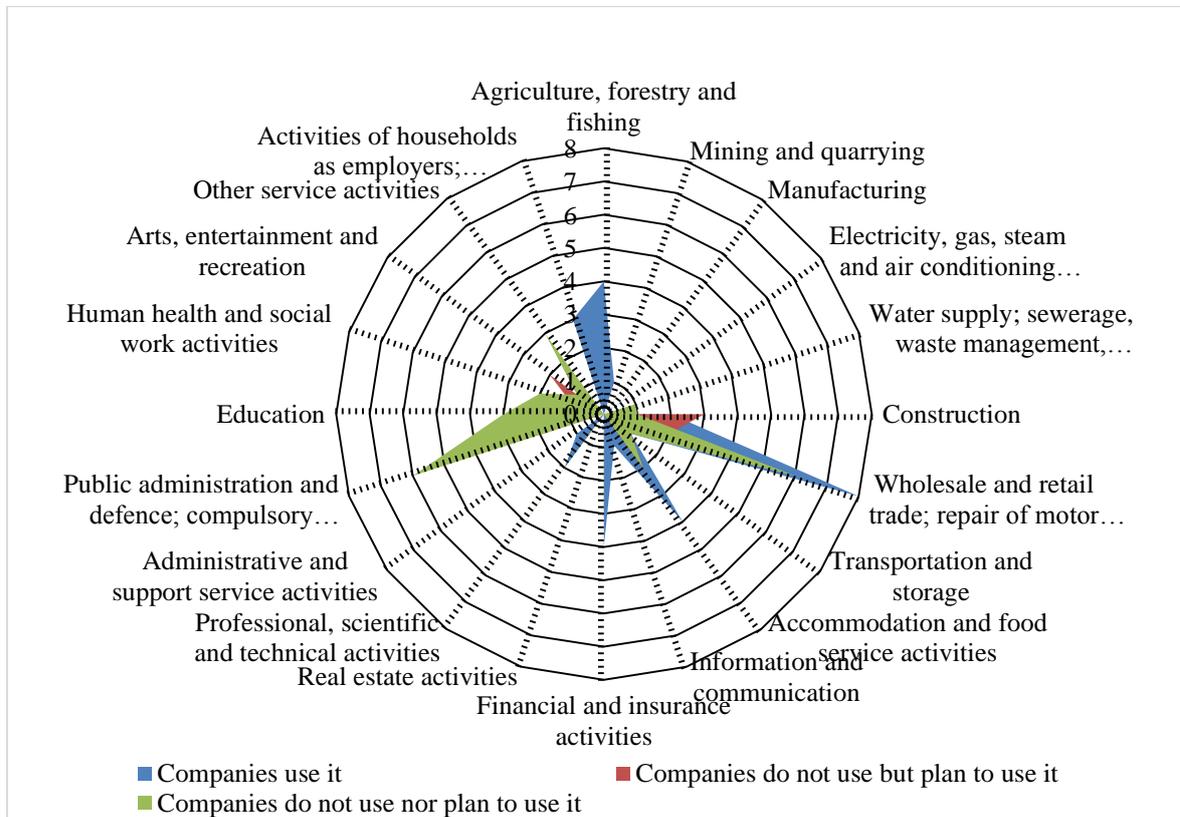


Fig. 4
File storage, file sharing (Source: own research)

Based on the results my first research hypothesis has been proven as less than one-third of the Hungarian companies are aware of the concept of cloud computing service.

My second hypothesis was that from the enterprises that are familiar with cloud computing services, few of them apply the services in the fields of data analysis, email, email marketing, file storage and file sharing, and it was only partly validated by the empirical survey. Based on the results cloud computing emailing is common among the Hungarian enterprises and more than half of them use cloud computing service for file storage and file sharing, but cloud computing data analysis and email marketing is not widespread at all.

SUMMARY

Based on my empirical research it can be concluded that Hungarian enterprises can be considered underdeveloped in this regard. My research hypothesis related to the reputation and prevalence of cloud computing technology has been proven, as less

than one-third of Hungarian enterprises use cloud computing service. I partly accept my second hypothesis which stated that from the enterprises that are familiar with cloud computing services, few of them apply the services in the fields of data analysis, email, email marketing, file storage and file sharing. Based on the measured results we can say that data analysis, email marketing and file storage, file sharing are applied by few people in practice, many of them do not even plan to introduce them. However, I recognized that email service is used by companies in an outstanding share (70.53%). The low prevalence is probably due to the fact that companies struggle with ongoing liquidity problems and there is no specialist for developing IT in the organization. A further direction of research can be the validation of results and examination of what connection can be found between low use of cloud computing services and the entrepreneur's age, other characteristics of the enterprise, the mistrust towards the new technology or the inappropriate marketing activity of the providers.

[6] points out that cloud computing provides a basis for companies to transform their business models rapidly. Companies store services and data in the cloud that can be connected in order to create new and innovative applications or business processes. By means of their use they create an open cloud environment that is safe and the information stored there is protected. So the cloud computing service, which started as an efficiency-increasing and cost-saving technology, became the driving force of the organizational innovation.

BIBLIOGRAPHY

- [1] KANG, C.: **Cloud Computing and Its Applications in GIS**. Dissertation, Clark University, Worcester, 2011, <http://docplayer.net/5978852-Cloud-computing-and-its-applications-in-gis-cao-kang-may-2011-a-dissertation.html> [Downloaded: 29.01.2016.]
- [2] SALESFORCE UK: **Why Move To The Cloud? 10 Benefits Of Cloud Computing**, 2015, <https://www.salesforce.com/uk/blog/2015/11/why-move-to-the-cloud-10-benefits-of-cloud-computing.html>. [Downloaded: 11.02.2016.]
- [3] GIANNAKOURIS K., SMIHILY M.: **Cloud computing - statistics on the use by enterprises**, 2014, http://ec.europa.eu/eurostat/statistics-explained/index.php/Cloud_computing_-_statistics_on_the_use_by_enterprises [Downloaded: 01.02.2016.]
- [4] SASVÁRI P., NAGYMÁTÉ Z.: **The Empirical Analysis of Cloud Computing Services among the Hungarian Enterprises**. In: Handbook of Research on Cultural and Economic Impacts of the Information Society. IGI Global, Hershey, pp. 121-150., 2015, <http://real.mtak.hu/25940/> [Downloaded: 25.01.2016.]
- [5] KASSAI J.: **A felhőalapú számítástechnika ismeretének és használatának empirikus vizsgálata az ausztriai és a magyarországi vállalkozásoknál**, Szakdolgozat, Miskolci Egyetem, 2015
- [6] LEBLANC R.: **Three Ways Cloud Computing Is Driving Rapid Innovation**, 2014, <http://www.forbes.com/sites/ibm/2014/09/02/three-ways-cloud-computing-is-driving-rapid-innovation/#cf7780473fbb> [Downloaded: 07.02.2016.]