

## CLLOUD COMPUTING AND ITS BENEFITS

MARIA PARLINSKA, IRYNA PETROVSKA

*Division of Quantitative Methods, Faculty of Economic Sciences (SGGW)*

In the paper the benefits of the use of cloud computing are presented. It concerns the development of the cloud technology. With developing of the cloud computing tools, it is observed the big transformation in IT industry. Cloud computing has big impact also on economic side of the society. It is not possible to imagine the future development of the company and the whole economy without taking into consideration the benefits of cloud computing. The article is a source of knowledge for comparison with our own research on the benefits of cloud computing, but those results will be shown in the future articles.

Keywords: Cloud Computing, Economics of information, Information

### 1. Introduction

Nowadays every single entity is looking for the way to decrease its expenses. The main aim of inventing the cloud computing was not just to improve the information technology in purpose to make the process faster and less complicated, but to get economic value of using the cloud. Decreasing of time consuming (which is also connected with economic benefit, as it is known that the time is money), decreasing the money spent on IT support and so on made the cloud computing the part of economic science which is called Economics of Information.

Among the main specialists, who worked on problem of the use of information and its role in economy it should be highlighted the following scientists [2]:

- Kenneth J. Arrow, who pointed in his research the problem of asymmetric information as a result of unequal access to information of economic entities, what has negative influence on economy.
- William S. Vickrey, who got Nobel Prize for research on allocation of resources in conditions of asymmetric information;
- George A. Akerlof, Andrew Michael Spence, Joseph Stiglitz, who got Nobel prize for research on asymmetric information;
- and there are plenty others, who made big contribution into Information Economic Science.

Among other research papers related to the use of information systems in economy, it should be pointed the work “Digital Depression”, written by Dan Schiller. This book is about influence of information technology on economic crisis. Author showed the role of digital technology for global economy, financial and production networks etc. [4].

It should be mentioned the book written by Joe Weinman titled “Cloudonomics: The Business Value of Cloud Computing” among the literature about cloud computing. There is possible to find one of the best definition of business value of cloud computing,. The author defined the term Cloudonomics as short abbreviature of Economics of Cloud Computing. In the book, there are presented many aspects of cloud computing such as: its precise definition, role of cloud in economies of scale, competitive advantage and customer value, the advantages of cloud etc. [5].

The current development of cloud computing, different published forecasts, as well many initiatives taken by international organizations and the governments of many countries in the world, shows the rapid development of solutions based on this computing model in the coming years of XXI century.

## **2. Definition of the cloud computing and its benefits in company management**

The first draft of the cloud computing definition was created by The National Institute of Standards and Technology of the United States Department of Commerce in November 2009. "They went through many versions while vetting it with government and industry before they had a stable one." That first version was posted to the NIST cloud computing website in July 2009. In January 2011 that version was published for public comment as public draft SP 800-145. The definition presented by The National Institute of Standards and Technology of the United States Department of Commerce tells that the cloud computing it is:

"model which allows versatile, convenient, on-demand network access to a shared pool of configurable computing resources (like the network, servers, storage, applications and services) that can quickly provide and share with minimal effort management or with minimal interaction with the service providers” [12].

The NIST definition lists five essential characteristics of cloud computing:

- on-demand self-service,
- broad network access,
- resource pooling,
- rapid elasticity or expansion, and
- measured service.

It also lists three "service models"

- software,
- platform and
- infrastructure),

Some "deployment models" like private, public and hybrid categorize ways to deliver cloud services to stakeholders [12].

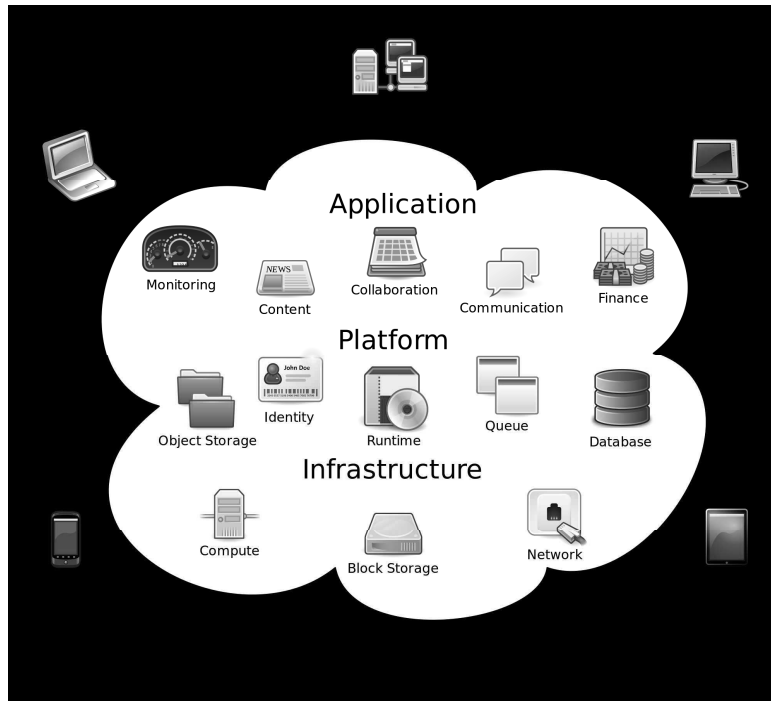
Cloud computing connecting technology, service and application into self-service tools, which are accessible by Internet. The main types include clouds public, private and hybrid; the most important services offered by such clouds are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). These cloud services can be provided with data centers located anywhere in the world, which has important economic as well political consequences. Those three types of cloud computing base on its location [11]:

- Public Cloud: located outside of entity (the user of cloud). The user has limited access to cloud infrastructure. Working in this cloud does not require the special equipment, apart Internet access. It is very convenient for those, who is looking for fast and cheap access to data;
- Private Cloud: is opposite to the public cloud. The purpose of use of such cloud is working in the cloud inside one organization with many users. Such type of cloud computing gives the possibility to build the cloud by taking into consideration all company preferences and needs, what is of course costlier;
- Hybrid Cloud: is a combination of private and public cloud.

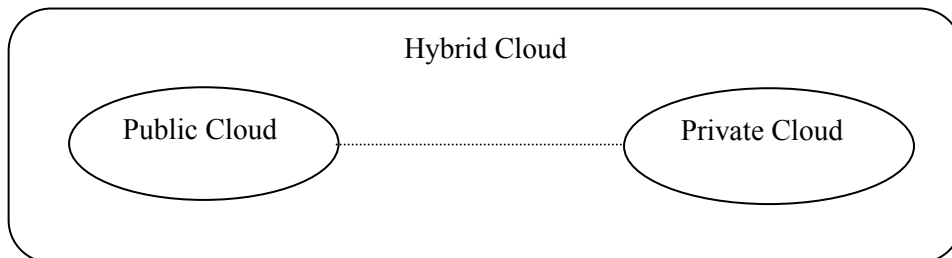
One can propose the simplest definition of the cloud which tells that: "cloud computing is the model of access to the data, its storage and processing" [3].

The easiest way to imagine the cloud computing is to see it on the graph 1.

Cloud computing is a new computing model that can bring significant benefits to consumers, businesses and governments, while being a source of new threats and challenges. [6]. Cloud computing is the next stage of industrialization (standardization, increasing scale, widespread availability) in the provision of computing power in the same way that the supply of electricity made in industrialization. Thanks to standardized interfaces users can leave the details to the experts, so that it is possible to achieve much greater economies of scale by those multiple users than could ever be possible in case of those individual users.



**Figure 1.** General structure of Cloud computing  
*Source:* [3]



**Figure 2.** Types of cloud computing  
*Source:* made by authors using materials presented in [3]

Joe Weinman defined the following attributes among the economic benefits of the use of cloud computing for company [5]:

- Common infrastructure - gives possibility to decrease the money spent on Information Technology equipment (for example: no need to have own server);

- Online accessibility - means that in purpose to use the cloud service the user needs only the Internet access. Cloud does not exist without network;
- Location independence - means that users can access the cloud services at any location they are;
- Utility pricing, where users of the cloud pay only for the service they currently use, so called pay-per-use pricing;
- On-demand resources, which gives possibility for users to allocate the right quantity of resources at the right time. So, the users get all information they need based on their current real time demand.

The majority of Internet users benefit from cloud computing in the form of web-mail services and less use of Internet applications to share content. For consumers, the main advantages of the cloud are convenience, flexibility, reduced cost, ease of use, ability to share content, improved access to information and web content, automatic maintenance and updating and potentially greater safety [6].

For businesses, the biggest advantage is to avoid capital expenditure on IT and the ability to customize the size of IT resources; means lower entry barriers, faster introduction of new products to market and the ability to support the creation of innovative SMEs. Companies can also effectively work together through project management and collaboration services in the cloud [6].

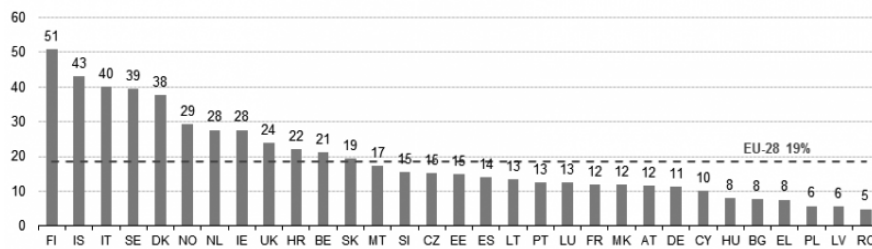
Government administration can benefit from cloud technologies by improving the quality and innovation within the framework of e-government services, which provides citizens and businesses. These services can reduce the administrative burden on citizens and businesses. There are already examples of public administration, both at local and national level, which has adopted or plans to adopt cloud services, and more and more governments develop comprehensive strategies for cloud computing [6].

The benefits of adoption cloud computing can be illustrated made in 2011. on behalf of the EU Commission study, which shows that 80% of organizations that have gone in a cloud model computing thus reduced costs by 10-20%. Other benefits include furthermore: more telecommuting opportunities (46%), greater efficiency (41%), normalization (35%), as well as new business opportunities (33%) and greater access to markets (32%). All available economic analyzes also confirm the importance of cloud computing and provide significant growth in this field around the world [13].

### **3. The use of cloud computing in European Union**

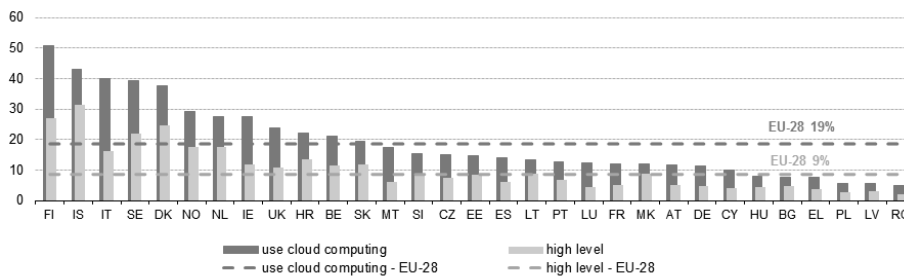
The EU has ambitious digital agenda, dating to 2020 year, which identifies many specific actions to achieve a strong and competitive European digital single market, and in this context it is considered as an important part of the overall EU

strategy for growth. As part of this agenda technological model called "cloud computing" was gaining in importance due to its expected macroeconomic benefits, for example, help start-ups to small businesses in entering the market. The "cloud computing" model can support innovative new Internet applications and save taxpayers' money used by the administration to provide ICT [13].



**Figure 3.** The use of cloud computing in Europe, EU-28, 2014

Source: [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:V2\\_Use\\_of\\_cloud\\_computing\\_services,\\_2014\\_\(%25\\_of\\_enterprises\).png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:V2_Use_of_cloud_computing_services,_2014_(%25_of_enterprises).png)



**Figure 4.** Enterprises with high level of dependence on cloud computing services, 2014 (% of enterprises)

Source: [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:V2\\_Use\\_of\\_cloud\\_computing\\_services,\\_2014\\_\(%25\\_of\\_enterprises\).png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:V2_Use_of_cloud_computing_services,_2014_(%25_of_enterprises).png)

Based on the figures 3 and 4, one can make the following conclusions [1]:

- 19 % of all EU enterprises were using the cloud computing;
- Poland is situated among the countries, where cloud computing was used the less;
- 46% of enterprises used advanced cloud computing services (highly depended). 49 % of enterprises used not advanced cloud (medium level), among which the first place belongs to manufacturing. So not only for information and communication activity cloud computing service is important. With technological progress in future all economic activities might use only the advanced cloud.

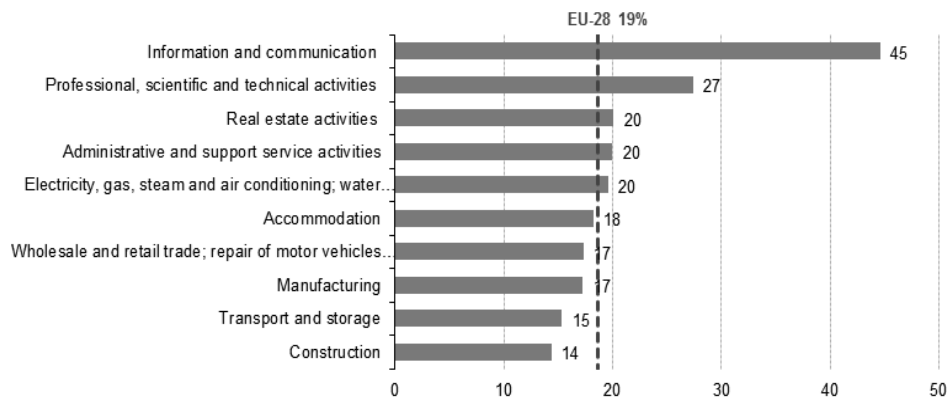
Unfortunately, in Poland the use of cloud computing is not popular in comparison with other EU countries. Enterprises should get more knowledge about cloud in purpose to trust it and to be able to discover all possible benefits of its use.

The market for cloud model according to last year's edition of the TOP200 Computerworld report, is worth 611 million PLN. These were only 0.6% of the total ICT market (105.3 million PLN) and 4.8% of the value table largest IT services providers in Poland (12.8 million PLN). The findings confirm the estimates Computerworld TOP200 analytical center IDC, according to which part of cloud computing in the Polish IT services market is about 4% [13].

We know that the cloud computing services are going to the Polish market with some delay compared to the old EU countries. Therefore, it is important to show what is the rate of change in Poland compared to other countries, which will assess whether or not we make up for the delay

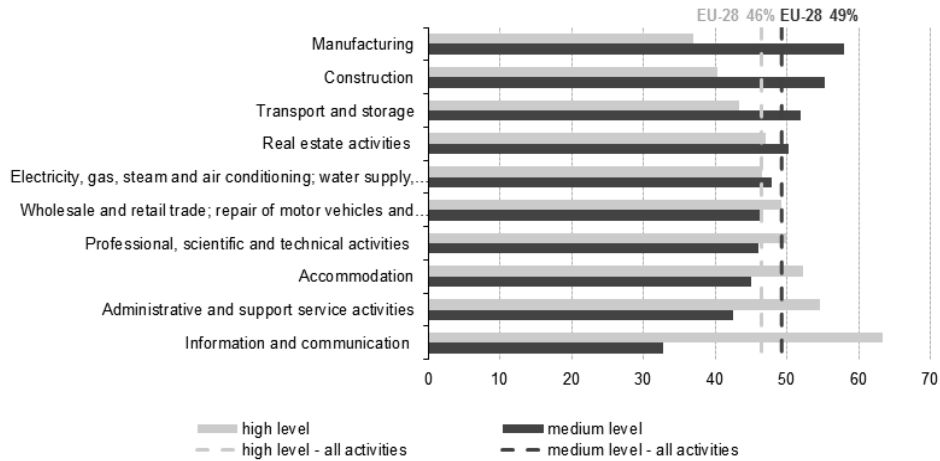
Small-scale use of cloud technology by Polish companies illustrate the Central Statistical Office of Poland, which informed that in 2015 year, only 7.3% of enterprises in Poland have used any form of cloud computing. The mean value still is overstate by large companies and corporations, for which the rate was 24.7%. But it is worth noting that at the end of 2016 already 18% of companies in Poland benefited from the cloud [8].

The use of cloud computing services by economic activity, EU-28, 2014 is shown on the Figure 5.



**Figure 5.** The use of cloud computing services by economic activity, EU-28, 2014

Source: [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:V2\\_Use\\_of\\_cloud\\_computing\\_services\\_2014\\_\(%25\\_of\\_enterprises\).png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:V2_Use_of_cloud_computing_services_2014_(%25_of_enterprises).png)



**Figure 6.** Degree of dependence on cloud computing, by economic activity, EU-28, 2014

Source: [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:V2\\_Use\\_of\\_cloud\\_computing\\_services,\\_2014\\_\(%25\\_of\\_enterprises\).png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:V2_Use_of_cloud_computing_services,_2014_(%25_of_enterprises).png)

Commvault's (a publicly traded data protection and information management software company headquartered in Tinton Falls US) experts have prepared a statement of the five most important trends in software that in 2017 a significant impact on business development. In the first place it was mentioned cloud computing. Currently, it is used by 18% of Polish companies. In 2017 years this percentage will significantly increase. The potential of cloud solutions will be increasingly used. Steadily increasing openness to the cloud for data storage backup and archive both based of global providers as Amazon Web Services (AWS) or Rackspace (a managed cloud computing company based in Wind-crest, Texas, USA) as well as local, specialized service providers tailored to the needs of the local market [8].

It is important to emphasize that broad access to the ERP in the cloud can significantly help small businesses. Providers hope to have a large potential for growth in 2017 [9].

#### 4. Conclusions

In the article, it was defined the term of cloud computing, types of cloud and highlighted the main attributes connected with the use of cloud. It is not possible to imagine the development of economic science without the chapter about economics of cloud computing. Nowadays technological progress influence every single part of human life. It is important for the users (for example companies) to know what



is cloud and to be able to benefit from the its use. Understanding the conception of cloud computing will help for users to save money and to reduce the amount of missed opportunities.

## REFERENCES

- [1] Giannakouris K. , Smihily M. (2015) *Cloud computing statistics on the use by enterprises*. [http://ec.europa.eu/eurostat/statisticsexplained/index.php/Cloud\\_computing\\_-\\_statistics\\_on\\_the\\_use\\_by\\_enterprises](http://ec.europa.eu/eurostat/statisticsexplained/index.php/Cloud_computing_-_statistics_on_the_use_by_enterprises) [19.09.2016]
- [2] Parlinska M. (2008) *Rola informacji w gospodarce rynkowej na podstawie wybranych rolnych rynków hurtowych*, Wydawnictwo SGGW, Warsaw, Poland.
- [3] <http://docplayer.pl/1251271-Podrecznik-zastosowania-chmury-obliczeniowej-w-administracji-publicznej.html> [09.09.2016]
- [4] Schiller D., (2014) *Digital depression*, University of Illinois Press, Urbana, Chicago and Springfield, USA.
- [5] Weinman P. (2012) *Clouonomics: the Business Value of Cloud Computing*, Hoboken, New Jersey, USA.
- [6] Fielder A. BrownI., [http://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/475104/IPOL-IMCO\\_ET\(2012\)475104\\_PL.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/475104/IPOL-IMCO_ET(2012)475104_PL.pdf) [19.10.2016]
- [7] Pietruszyński P. (2016) [http://www.computerworld.pl/news/405741/Dlaczego\\_chmura.sie.w.Polsce.nie.udaje.html](http://www.computerworld.pl/news/405741/Dlaczego_chmura.sie.w.Polsce.nie.udaje.html) [15.10.2016]
- [8] Janus R. (2016), <http://itfocus.pl/polecane/5-najwazniejszych-trendow-it-w-2017-roku/>
- [9] <http://odl.com.pl/system-erp-chmurze/>
- [10] Hon, W. K., Millard, C. & Walden, I., *Who is Responsible for 'Personal Data' in Cloud Computing? The Cloud of Unknowing*, Part 2, 2011.
- [11] Cypryański J. (2013) *Rozwój zastosowań chmury obliczeniowej w administracji publicznej – prognozy, bariery, korzyści*, Roczniki Kolegium Analiz Ekonomicznych nr 29/2013, pages 80-90; [http://rocznikikae.sgh.waw.pl/p/roczniki\\_kae\\_z29\\_06.pdf](http://rocznikikae.sgh.waw.pl/p/roczniki_kae_z29_06.pdf) [19.01.2017]
- [12] The National Institute of Standards and Technology, <http://www.nist.gov/itl/csd/cloud-102511.cfm> [10.12.2016].
- [13] Wykorzystanie potencjału chmury obliczeniowej w Europie, Komunikat Komisji Europejskiej COM(2012) 529 final, 27 września 2012 [19.12.2016].