

Effects of the transformation of company computer system on cloud computing services – a change in company management

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□ **Abstract**— paper deals with the transition of companies to information systems operated using cloud computing services. The influence on the competitiveness of company and its organizational support is analysed. The developmental trends and their impact on company management are also described. The benefits and drawbacks from the transition to flexible ICT architecture are emphasized. Theoretical framework and literature support the fact that exploitation of cloud computing services is an inevitable component of the information strategy of European countries in the support of companies' competitiveness. Based on the collected information and own experiences with using the cloud computing, the recommendations for the effective transition to the application of cloud computing services in a company are proposed.

I. INTRODUCTION

Managers keep looking for new means to improve management efficiency. Intensive use of modern IT technologies has become an essential part of the management process. Managers are aware of that and want to exploit the potential of new ICTs in the management of companies and their environment.

Thanks to today's modern communication technologies and social networks, each day we create huge amounts of data, both in the corporate environment and beyond.

The impressive boom in information technology, which started in the late 1990s, brought about a rapid acceleration of our lifestyles as well as of the overall approach to entrepreneurship and its support by ICTs.

The current trends in ICT having an impact on the efficiency and the type of organizational structure include, in particular: the development of dynamic network services, increase in the performance and capacity of data centres, business through mobile technologies, increasing demands on IS security, processing increasing volumes of data the development of Cloud Computing (CC). [1]

The economic crisis, development of new technologies and rapid globalization, the growth of the importance of access to

relevant information and desire for mobility, act as catalysts for the global population.

II. TRANSITION TO THE USE OF ICT AS A SHARED SERVICE – CLOUD COMPUTING

Managers require a comprehensive information system containing the necessary functions, at different times and in the necessary scope. The aim is to ensure the necessary flexibility in management. This is made possible by Cloud Computing services. The CC services increase company flexibility and have a positive impact on its production and competitiveness.

CC has no uniform definition; each definition depends on the perspective of its author.

„A cloud is defined as the combination of the infrastructure of a data centre with the ability to provision hardware and software.“, says Sosinsky. [2]

Gartner defines cloud computing as “a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using Internet technologies”.

Another definition of CC from a different perspective says that “*Cloud Computing is essentially a concept that allows you to access applications that are actually located elsewhere than on a local computer or device connected to the Internet, most commonly in a remote data centre.*” [3]

In summary, CC is simply the “*approach to the use of computer technology, which is based on providing shared computing resources and their use in the form of a service.*”

The author of this paper relies on the definition of the US National Institute of Standards and Technology, which defines the CC as a “*model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.*” [4]

III. DEFINITION OF THE PROBLEM

This article aims to identify possible pitfalls of the transition of the company IS to a flexible ICT architecture

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and operation of IS in the form of CC services and to draft procedures and recommendations to successfully manage this transition.

Due to the long experience of the author with CC services, the paper discusses benefits and risks of operating the IS in the form of CC services. In the recommended transformation of the company IS into the CC, the author also draws on her personal experience.

Innovative, so far untested information and communication technologies can significantly improve the performance of a company IS on the one hand, but if incorrectly implemented, they can cause fatal damage in situations beyond the control of the company. [5]

IV. TRANSFORMATION OF A COMPANY'S INFORMATION SYSTEM INTO CLOUD COMPUTING

It needs gradually and conceptually change the overall IT architecture. The investment in building the concept of a flexible IT architecture have no direct financial return, but they lead to a significantly faster and cheaper integration of new components and implementation of changes.

- Demands on the suppliers of CC services:

Today, managers emphasize the requirements for shortening the delivery times, budget reductions and complexity of mutually integrated systems.

Customers also increasingly demand the mobility of solutions. Applications can run anywhere; therefore, their mutual integration should be defined by standard interfaces.

There is an increased pressure on the use of innovative approaches, such as agile development, prototyping or extreme programming.

Analyses of a new generation of ICT infrastructure. Analytical tools based on big data become critical and their real-time analysis then facilitates the development of applications for business intelligence and control of transmission networks. [6]

Analytical tools based on big data and their real-time analysis then facilitate the development of applications for business intelligence and control of transmission networks.

The decisions on the transformation of part or the entire company IT to CC is part of the information strategy of a company or institution. The supplier cannot deal with the transition to CC without coordination with company managers, who are informed about the possibilities of current ICT in relation to the entire business strategy of the company, availability of human and financial resources, know-how, etc.

The decision to transform the entire company IT (or its part) to CC is part of the information strategy of a company or institution. The supplier cannot deal with the transition to CC without coordination with company managers. [7]

- Impacts on user companies and organizations:

As a result of operating applications in CC, companies will reduce the number of technology-oriented specialists (there will be less need for programmers, administrators, and other professionals).

However, the number of employees ensuring the links between business and ICT services is set to grow. Nevertheless, the total number of workers involved in the use of ICT in the company will not decrease, although their qualification structure will change. [8]

Companies will need to develop key skills supporting the use of ICT – how to use ICTs to gain a competitive advantage, create new products or services, find new customers, speed up the company's response to external events and reduce the costs of business processes. [9]

- In other words, how to support business processes by an appropriate selection of ICT services:
 - how to determine the content, volume, quality and price of ICT services,
 - how to design the overall architecture of ICT services,
 - how to find and implement the selection of the optimal supplier of ICT services,
 - how to systematically monitor the delivery of ICT services,
 - how to develop rules for the controlling of IT services and measure the impact of ICTs on the quality of company processes. [10]

This will require changes in skill required from managers. Managers who will understand how to use ICT to create a new product or service and how to get new customers will become indispensable members of senior management.

V. APPROACH TO CLOUD COMPUTING SERVICES IN EUROPE

Europe pays close attention to CC services because their use can significantly affect performance and competitiveness, particularly of small and medium-sized enterprises, which in many countries have a considerable impact on their economic stability.

A significant role played in these initiatives EuroCloud Europe. EuroCloud agrees that in a world Cloud Computing will become the main tool for collecting, processing, storing and selecting information and knowledge.

EuroCloud Europe is a cloud-based organization with its headquarters in Luxembourg. It builds strong relationships with local governments and the European Commission and supports the environment for the development and growth of cloud computing as a tool to support the growth of business and competitiveness. It sees cloud computing as one of the most important impulses for the creation of a knowledge

society in which physical resources are optimized and shared resources are universally accessible.

Currently, members of EuroCloud include 22 European countries that are very different both in terms of the rate of utilisation and provision of cloud services and the willingness to participate in the observance of standards and legal and security conditions which are crucial for an effective Europe-wide application. The activities of individual members can be found on the EuroCloud Europe website. [11]

VI. HOW TO MAXIMIZE THE EFFECT OF SHARED SERVICES

This chapter provides a summary of the measures that should be implemented to support the strategy of transition to CC services in order to get the greatest possible benefit from its implementation.

Individual steps (phases) in the transition to the CC:

- The initial step when trying to maximize the effects of the transition to CC is the preparation of a schedule of a gradual conceptual transformation of the entire IT architecture. In terms of management, this document is a strategic document (see Chapter 4).
- It is followed by the specification of requirements which will be crucial in the choice of the supplier. Fundamental aspects include:
 - time of delivery,
 - amount of cost,
 - functionality,
 - performance of the information system,
 - complexity of the information system.
- In the third step, it is necessary to specify the progressivity rate of the IS. If the IS is to be progressive, the specification should also include demands on the rate of mobility and alternatives of the required access to its implementation. At this stage, it is also necessary to specify possible requirements for means allowing real-time analyses and the management of computer networks.

Managers must be trained in these steps so that they can propose how to use ICT to improve the course and management of business processes, thus promoting the development of their own business.

The possible focus of training:

- how to use ICT to gain a competitive advantage,
- create new products or services, find new customers,
- speed up the company's response to external events,
- reduce the costs of business processes. [12]
- The next step is adapting the qualification structure of employees as needed. This is due to the increase in the demand for employees ensuring the link between business and ICT services.

Managers who have been trained and proved their worth among the members of senior management will

then participate in all senior discussions on company strategy, changes in marketing and sales.

- Now, attention is paid to the financial aspects of the transition.

It is necessary to:

- prepare the budget in consideration of the changes in the cost structure – linearization of costs (elimination of the investment component),
- prepare the employees for the measurement of consumption – gaining control over their work.

It needs to use of the scalability of shared services. [13]

Also:

Prepare the employees for the measurement of consumption – gain control over their work. The manager gets a good overview of what his/her employees are doing and how they are doing it.

- Thanks to fees for shared services, it is easy to get a detailed overview of the operating costs of individual agendas and identify these agendas.
- The final step is the preparation of a document on contractual relations with the service provider. It contains:
 - specific requirements
 - specific responsibilities to be delegated to the provider, under what conditions,
 - with what guarantees and also with what sanctions in case of non-compliance.

Likewise, agreements are to be prepared.

- The specification of the contractual relationship is to be focused on:
 - the provision of services
 - subject, functionality
 - objectives
 - expectations.

Service scaling:

- change of scope,
- quality,
- time of provision).

Ensuring connectivity:

- connectivity provider,
- connectivity downtime,
- the protection of personal and other sensitive data,
- the division of responsibilities between the company and the supplier,
- the legal status of physical equipment used to provide services,
- software licensing terms,
- conditions of system migration,
- required customization.

Specific impacts will also become evident on the side of interested users of shared services, whether users from among companies or private owners, because they change to shared services so that they could benefit from a profit and be able to operate more efficiently, faster, and with better

planning. They can concentrate more on their core business, their mission or the entrusted tasks and do not have to be distracted by operational or other secondary activities.

VII. CONCLUSION

Current demands on the pace of life require the appropriate form of management. Management puts demands on the flexibility and information resources to support decision making. In order to maintain the quality of management at the highest level, it is necessary to use all the features of the existing information and communication technologies. The use of CC is one way to achieve this. Based on the findings in the available literature and the author's own experience of working with CC technologies, the paper provides recommendations for the transition to CC in companies and institutions. Recommendations are made with regard to the current situation in each company. These recommendations include a set of activities that need to be done to maximize the benefit from this change. Due to the variability of current conditions, this paper encourages further research into this area to ensure increasing flexibility and quality of the management of companies and institutions.

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