Chapter 2
Organizational and Management Aspects of Cloud Computing Application in Scientific Research

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ABSTRACT

This chapter is focused on the business model of scientific research, theoretically analysing managerial, organizational, and financial, rather than technical aspects of this concept. Theoretic explanation is based on an organizational networking platform. In practice, this platform is presented by Seven Bridges Genomics software solution, and the new opportunities for the organizational network broker are illustrated both in theory and practice. The impact that cloud computing has upon organizational performances is theoretically explained by costs of the ICT infrastructure, as well as of transactional and opportunity costs of operations. Through cloud computing, approach opportunity costs are reduced and efficiency is increased. The business model is presented in the framework of Osterwalder and Pigneur. By means of theoretical analysis and practical example, the authors demonstrate the development of a business model related to scientific research in bioinformatics. Cloud computing enables organizational separation of two distinct parts of the scientific research business model: core research and IT support. From the perspective of efficiency, network achieves a higher level of capital utilisation, better resistance to business risks, lower transaction costs, and in general, better efficiency, while the core research part has the opportunity to focus its structure on effectiveness and creativity.

INTRODUCTION

This article discusses how cloud computing concept is influencing strategic business aspects of scientific research. Other information and communication technologies (hereinafter: ICT) concepts have also influenced strategic management, (Nolan & McFarlan, 2005) increasing competitive advantage of the business systems if applied in accordance with business aspects. Idea of strategic implementation of ICT is based on the assumption that economic performance is directly associated with the management's competence to create strategic feedback between the market position of the organization and the design of the adequate support for achieving goals (Čudanov, Krivokapić, & Krunić, 2011). Therefore, means for achieving adaptable and dynamic competitive advantage are not regarded from a technocratic view, as a set of sophisticated and advanced technological functionalities, but instead as organizational solutions for better technology utilization in comparison with the competitors (Henderson & Venkatraman, 1993). In other words no ICT application, no matter how technically sophisticated and advanced, can ensure competitive advantage (Čudanov, Krivokapić, & Krunić, 2011). Also, it does not represent fully strategic implementation of ICT, if it is applied without analysing organizational aspects and business model (Čudanov, 2011). The real benefit from the strategic implementation of any ICT concept, in this case cloud computing paradigm, is achieved by the organization's ability to make a long-term use of the ICT based functionalities (Čudanov, 2011). Today, companies base their abilities mostly on information and communication technologies, often without contingent planning - risking that the failure of ICT infrastructure leads to breakdown of organizational operations. Therefore organization should strategically analyse implementation of ICT in order to prevent ICT failures without acceptable solution. Strategic implementation of ICT has four suggested categories:

1. Systems that share information through technologically based systems with buyers/consumers and/or suppliers and change the nature of the relationships;
2. Systems that are more effective in integrating the use of information in the process of new value creation;
3. Systems enabling the organization to develop, produce, place on the market and deliver new or improved information-based products or services; and
4. Systems supporting the managers with development and strategy implementation information, especially by integrating the relevant internal and external information obtained from the analysis (Ward & Peppard, 2009).

It is often a case that ICT determine virtual organization and serve as basis for strategy design (Jaško, Čudanov, & Jevtić, 2009). Our practical example of Seven Bridges Genomics generally covers first three categories of strategic ICT implementation.

One of currently very interesting topics of strategic ICT application is Cloud Computing paradigm, defined as the "Model that adequately ensures access to the shared set of computer resources (e.g., networks, servers, memory space, applications or data processing services) that can be configured, promptly protected and used with a minimum effort by the organizational management or interaction with the entity providing the services." Main characteristic of cloud computing are: autonomous use of services at request, broad access to the network, joining resources, fast flexibility (of response to user claim) and measuring of service delivery; it can be used as private, public, hybrid and joined; three manners of service provision are described: software as service, platform as service and infrastructure as service (Mell & Grance, 2009). Companies today face turning-point: to adopt or not to adopt the cloud computing concept and practically set

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