Understanding Business Models on the Cloud

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INTRODUCTION

The relationship between business models and technologies is an increasingly important issue. New technologies instigate new business models and new business models enable commercialization and success of new technologies. Building on this notion, this chapter synthesizes the literature on business models and cloud computing- a relatively new information technology- It shows that the relationship between business models and cloud-based systems create two distinctive technological trajectories: 1) cloud computing as a business model which can be seen as the development of cloud computing business models' (hereafter CCBM) and 2) cloud computing-enhanced or enabled business models which can be broadly thought of as traditional business modeling with improvements using cloud computing (hereafter BMCC). The former refers to a technological model or a system that commercializes value created solely by cloud-based systems in public and private sector. Whereas the latter refers to various ways that cloud-based systems can be and have been integrated into existing business models to enhance improve or enable creation and commercialization of new value. An explicit acknowledgement of these two trajectories and their underling architecture are remarkably absent in the literature. Therefore, discussion outlined in this chapter is a timely contribution to the growing body of knowledge on how and why cloud-computing matters as a revolutionary technology.

The chapter proceeds as follows: first an overview of the concepts of business model within the framework of technology management is offered in order to outline where the business modeling stands with respect to cloud computing as an emerging technology. Then cloud computing as an emerging technological paradigm will be discussed. Next, the architectural and structural ways through which business models and cloud computing systems are integrated will be illuminated in terms of two technological trajectories as briefly outlined above. Finally, the chapter concludes with a discussion on the implications of this conceptualization for theory and practice.

BACKGROUND

Technologies are developed to provide solutions to the problems humanity face. One of the most striking characteristics of our era is the exponential growth in the amount of information produced and the consequential need to process and store it. Information technologies refer to a family of technologies that solve such problems by enabling us to systematically collect, storage, clean, organize (mine), analysis, transform and present (visualization) information to satisfying our evolving needs.

Technologies do not emerge in vacuum. Their development is based on a purposeful orchestration of resources and application of knowledge. Business models play a fundamental role in this process. A business model defines the purpose of the technology and determines how resources are configured and orchestrated to bring the technology into the market (Chesbrough & Rosenbloom, 2002). When a technology is brought into the market it opens new avenues to develop new busi-

DOI: 10.4018/978-1-5225-2255-3.ch098

ness models (Teece, 2010). This interplay pushes the technological frontiers forward, makes old technologies obsolete and creates demand for new technologies (Najmaei, 2012, 2014b). Let's look at the information technologies as an illustration of this process. The traditional and still prevalent business model of ITs is based on investment in infrastructure. Simply said, if one needs to store and process data one has no choice but to buy or build a datacenter and a server to get these tasks done. This business model has worked well for years, and evolved into a global cluster of industries that offer advanced tools, systems and models all requiring heavy upfront investment and ongoing maintenance. In addition, technologies to process and store information are not easily available when we need them, where we need them.

Cloud computing (CC) is a technology developed based on a radically different business model aimed at solving these problems. It is a revolutionary approach to the provision of information technologies and radically changes the traditional business model of IT. CC offers a new way to make information technologies available to those individuals and organizations who demand it, when they need it, and where they need it by reducing the need for initial investment, hosting and ongoing maintenance (Hayes, 2008).

The idea behind CC is to bring the long-held dream of IT as a utility into life (Armbrust et al., 2009). CC is not only based on a new business model but also has a great potential to enable many new business models and radically change existing ones (Chang, Bacigalupo, Wills, & De Roure, 2010; DaSilva, Trkman, Desouza, & Lindic, 2013; Khanagha, Volberda, & Oshri, 2014; Lindgren & Taran, 2011; Weinhardt et al., 2009).

The constant interaction between existing and new technologies and business models epitomizes an evolutionary process which can be called technological business modeling (Najmaei, 2014a; Najmaei, Rhodes, & Lok, 2015). Drawing on this analogy, this chapter posits that the interplay between cloud computing and business models creates two distinctive technological trajectories each with important theoretical and practical implications: 1) the business modeling with cloud computing and 2) the cloud computing business model. The insights from the literature on technological paradigms, clusters and trajectories will be used to develop this argument.

CLOUD COMPUTING, BUSINESS MODELS AND TECHNOLOGICAL PARADIGM

As noted, technologies are developed to solve problems. In doing so each technology follows a specific paradigm. A technological paradigm is a model or pattern of solution of selected technological problems (Dosi, 1982). Technologies related to each other in a given paradigm form technological clusters (Dosi, 1982). Technological clusters such as nuclear technologies, biotechnologies, semiconductor technologies and information technologies are, hence, a group of technologies sharing the same paradigm and addressing similar problems (Dosi, 1982). Technologies advance and evolve within a cluster along technological trajectories. A technological trajectory is the pattern of normal problem solving activity on the ground of a technological paradigm (Dosi, 1982). These trajectories represent evolutionary directions of technological changes within a paradigm until a paradigm shift takes place when paradigms collapse, change, merge or new paradigms emerge (Dosi 1982).

Technological trajectories and paradigms are closely related to business models (Teece, 2010). A business model is a logic or a set of assumptions that determines how well a technology fits in the market (Chesbrough & Rosenbloom, 2002). Technologies are brought to the markets when there is a demand for them. A market for a given technology is a place where users of the technology meet its sellers to exchange the rights to own and /or use the technology. This exchange can't happen without a business model in place. Therefore, a business model as a model is a sim-