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Value Creation and Capture with Cloud Computing: A Theoretical Framework

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Abstract

This paper describes research-in-progress that explores the applicability and implications of cloud computing in the creation and subsequent capture of value. The quest for the silver bullet of the attainment of sustained competitive advantage has long featured in business strategy. While cloud computing capabilities have been much lionized, its value implications are still under-recognised in organisations. The cloud computing paradigm may offer a new architecture for fostering new business value propositions. In this research we propose a new 5-4-3-2-1 theoretical framework which is based on a review of the literature on cloud computing, value creation, value capture, value networks and competitive advantage. Taking the framework layer by layer, this paper describes the potential across components capable of offering value for organisations. The main contribution of this paper lies in proposing a framework that seeks to identify the best route(s) to value creation and the capture of that value thus, providing a visual mapping to enable organisations determine which cloud computing components, implementations and solutions are most suitable for the creation and capture of value.

Keywords: Cloud Computing, Competitive Advantage, Value Creation and Capture

1 Introduction

While some research has been carried out in order to determine how organisations can reap the benefits associated with cloud computing e.g. (Zhang et al., 2010, Brynjolfsson et al., 2010, Armbrust et al., 2010, Weinhardt et al., 2009, Buyya et al., 2009), there is no empirical study which has examined value creation and value

capture with cloud computing in order to achieve competitive advantage. Nor has research looked at how individual components of the cloud computing model layers are more conducive than others for the attainment of value. Thus, it is the objective of this study to explore the notion of cloud computing, its applicability, implications in a multiple partnering project ecosystem in order to identify key cloud centric enablers of value and ascertain the value creation and value capture processes utilised in the attainment of competitive advantage. The remainder of the paper is structured as follows. The next section presents building the theoretical framework, followed by a description of the research methodology and future project steps.

2 Building the Conceptual Framework

Focusing on value, the theoretical 5-*4-3-2-1* framework model (see figure 1) depicts a potential pathway to competitive advantage. The model provides a useful lens with which to identify key cloud-centric enablers of business value and competitive advantage. Taking the framework layer by layer, this paper delineates the value potential across components.

2.1 Competitive Advantage

The quest for the silver bullet of the attainment of sustained competitive advantage has long featured in business strategy. Over the past decades both the management and information system bases have actively participated in the discourse concerning the use of emerging technologies and computing paradigms as potential key enablers (Herndon, 2008, Porter and Cunnigham, 2004, Chesbrough, 2003a, Davenport, 1993). Recently, it has been argued that the capabilities of cloud computing may be leveraged as enablers of competitive advantage (Iyer and Henderson, 2012) and business value (Mohammed et al., 2010, Iyer and Henderson, 2010, Böhm et al., 2010).

2.2 Cloud Computing Layers

According to Mell and Grance (2010), as proposed by the American National Institute of Standards and Technology (NIST), cloud computing may be defined as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (for example, networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." Further, this description is

specific in detailing cloud computing as comprising five essential characteristics, four deployment models, and three service models. It is this definition and delineation that we employ in this paper, in particular, what we term the *5-4-3 model* layers (Clohessy, Acton & Coughlan, 2012), compromising of the essential characteristics layer, the deployment model layer and the service model layer.

2.2.1 Essential Characteristics Layer

This base layer (see figure 1) contains 5 well-described components that underpin the dogma of cloud computing. Numerous aspects buttress this layer, such as user-friendly user interfaces to cloud services and applications, network optimisation, security, resource sharing techniques, system virtualisation and leverage of existing best standards in distributed computing (See Vouk, 2008, Vaquero et al., 2009, Gong et al., 2010, Buyya et al., 2009). The manifestation of these 5 characteristics in an organisation is largely dependent on the deployment model utilised.

2.2.2 Deployment Model Layer

There are primarily 4 cloud deployment models, public, private, hybrid and community. According to Garrison et al., (2012) organisations may fail to capitalise on the benefits associated with cloud computing "if cloud deployment is ineffective". The value to an organisation rests with the cloud deployment model that best fosters processes that promote a greater focus on increasing core competencies while balancing this focus with the cost of cloud-based services.

2.2.3 Service Model Layer

This layer comprises the 3 well-established cloud computing service models commonly referred to as the SPI (Software, Platform, Infrastructure) model describing each as a service (Gong et al., 2010, Mell and Grance, 2010, Vaquero et al., 2009). The value of this layer is dependent on the choices made by organisations in the immediate sub-deployment model layer. Based on the aforementioned *5-4-3 model* structure described, we posit following propositions.

Proposition 1: The deployment model layer and service model layer of the cloud computing paradigm play pivotal roles in creation of a pathway(s) to value creation.

Proposition 2: Discrete individual components of each cloud computing layer are more conducive than the others in the creation of a pathway(s) to value creation.

2.3 Value Layer

Platform technologies such as cloud computing possess the potential to create considerable value when they are broadly accepted, however a difficulty exists with regard to the establishment and the advancement of these platforms (Chesbrough, 2003b). According to Nickerson et al. (2007) "competitive advantage stems from two distinct, albeit related, activities; value creation and value capture". The concepts of value creation and value capture must be clearly delineated as quite often organisations that create value through the use of a new process or technology fail to fully capture the value resulting in an unenviable situation where the value is either lost or shared with other competitors and users (Lepak et al., 2007).

2.3.1 Value Creation

The concept of 'value creation' has been well traversed in business literature. Value creation has been discussed in terms of dynamic capabilities e.g. Teece et al., (1997), resource based view e.g. Barney (1997), value chain analysis (Porter, 1985), transaction cost economics (Williamson, 1975) and schumpeterian innovation (Schumpeter, 1934) . However, these traditional value creation frameworks are not cloud centric and fail to fully capture the value creation dynamics of the cloud. The most comprehensive value chain reference model for cloud computing has been proposed by Mohammed et al. (2010), who argue that understanding the potential of the cloud for value creation is challenging due to "the diversity in requirements, inherited technical complexity and unstructured service schemes". However, their reference model is tailored solely on a micro economic capacity and more over the value chain ideology is far too limited for analysing a cloud computing environment consisting of multiple interrelationships between entities (Böhm et al., 2010). More recently, the concept of value networks have emerged as a nonlinear platform where value is created through collaborative interactions and the exchange change of resources in organisational networks. A value network may be defined as "as a set of relatively autonomous units that can be managed independently, but operate together in a framework of common principles and service level agreements (SLAs)" (Peppard and Rylander, 2006). Böhm et al., (2010) have proposed a generic value network which depicts interrelationships and value exchanges amongst the participants of the network. Value is created via an iterative process commencing with the production of elementary services (SaaS, PaaS, IaaS) which are refined through the value network.

2.3.2 Value Capture

Value capture, also referred to as value appropriation, refers to how an organisation may capture value once it has been created (West, 2007). A number of prerequisite steps have been identified as being essential for instantiating a sustained value capture strategy. First, Amit and Zott (2001) highlight the nuanced distinction between a business model and a revenue model in that a business model is largely concerned with value creation whereas a revenue model is primarily concerned with value capture. Thus, defining a revenue model is imperative. Second, the cost structure must be consistent with customer awareness of value (Chesbrough and Rosenbloom, 2002). Finally, an organisation may buttress their value capture strategy against competitors through capitalising on internal capabilities such as resources, core competencies and culture. Due to the complexity of the rapidly evolving cloud computing value network ecosystems which contain a multitude of actors on different layers of the cloud computing model, further research is required to determine where and how cloud computing value is captured (Böhm et al., 2010). Further, West (2007) argues that an organisation's "relationship to the network of providers of complementary products determines its value creation, value capture and the durability of its competitive advantage". To capture the concepts of value creation and value capture, we consider a value layer composed of two value sub-layers, creation and capture. However, we propose that in order to fully leverage cloud computing as an elixir for sustained competitive advantage, organisations must develop an instantiating value capture strategy. As a consequence, the value layer is awarded a more prominent visual sizing in our pyramid model (see fig 1). 3 more propositions are presented:

Proposition 3: The ability to achieve sustained competitive advantage with cloud computing is dependent on an organisation having an instantiating value capture strategy in place.

Proposition 4: Having a revenue model is critical to the ability of a firm to capture value with cloud computing.

Proposition 5: Being part of a value network of potential complementors is critical to the ability of a firm to create value, capture value and generate a sustained competitive advantage with cloud computing.

We now conclude our process of building a preliminary framework model from extant research by presenting the 5-*4-3-2-1* framework model in Figure 1.

3 Research Approach

An initial study will adopt a case study approach for the operationalisation of the framework in order to construct a visual mapping of routes to value that will enable an organisation achieve competitive advantage with cloud computing. Given the scarcity of empirical work in the area of value creation and capture with cloud computing, a case study research strategy is considered most appropriate. The case study approach allows for in-depth analysis of complex issues in real life settings (Yin, 2003, Stake, 1995, Benbasat, Goldstein and Mead, 1987). This study will initially involve a single in-depth case study of a multiple cloud partnering project ecosystem. Empirical data will be collected over an 8 month period from August 2013 to March 2014. The primary data collection sources will entail face-to-face semi-structured interviews, questionnaires, documentary evidence and observation of work practices. To triangulate, relevant documentary evidence such as emails, budgets, and meeting minutes, will also be collected (Denzin, 2006, Morse, 1991). Following the initial study, the case study approach will then be extended across multiple organisations with various cloud implementations.

3.1 The Case

The initial case is a multinational information technology corporation that provides technologies and software solutions to consumers and enterprises. The corporation offers a number of cloud offerings which encompass private, managed and public cloud services. The corporation also provides a cloud partner ecosystem which permits their partner organisations to enhance their own cloud offerings in an attempt to attract new customers and gain entry into new markets. The cloud partner ecosystem consists of a set of tools, documentation, support and best practices provided by the case corporation. In this study we propose to analyse five partnership projects within the case corporation. The profiles of the five projects shall differ in terms of the service model and deployment model used. The case study interview process will compromise two parts. Part 1 will deal with the evaluation of **proposition 1** and **proposition 2,** and semi-structured interviews will focus on an account of a cloud partnering project and the value creation opportunities offered by

cloud services among cloud partners. Interviewees will be persons with strategic management positions within the company and from partnering companies, and will provide an opportunity to explore different cloud deployment and service partnering environments. Part 2 will focus on **proposition 3**, **proposition 4** and **proposition 5**, with semi-structured interviews concentrating on an account of the partnering organisations' approaches to value capture. This part will encompass such topics as value proposition, value configuration, use of complimentary products or services, revenue model, customer relationship and cost model. The research findings will enable us to define categories of circumstances under which value creation is likely to be greater and the processes utilised to capture the value created. Figure 1 depicts a potential pathway to competitive advantage.

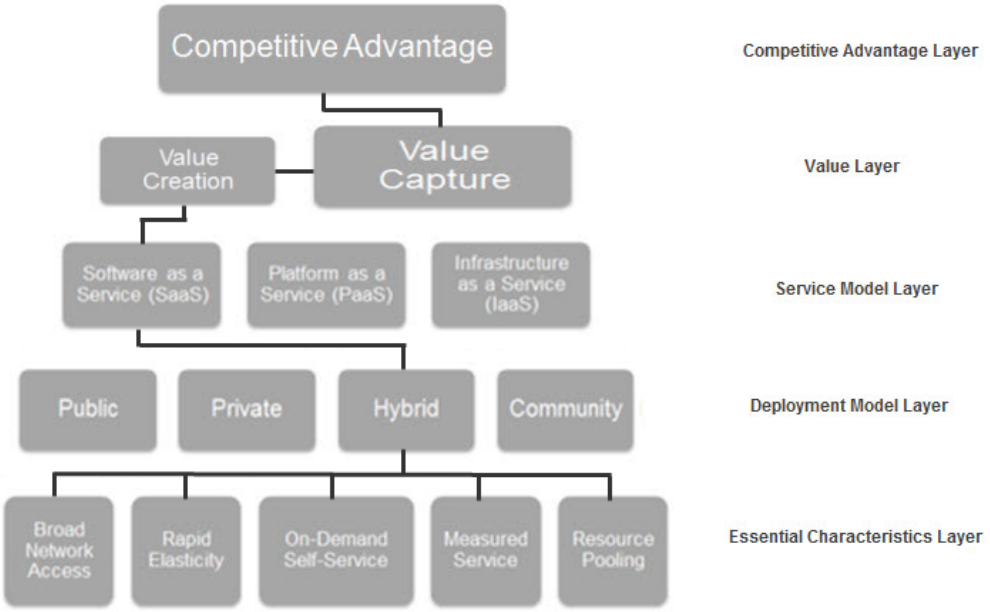

Figure 1. Theoretical Model (the 5-4-3-2-1 representing the number of elements at each layer)

4 Next Steps

This paper outlined research in progress aimed at exploring the applicability and validity of utilising cloud computing as a means of creating and capturing value in a multiple-project environment. To ensure the reliability and validity of data, we are currently refining the data collection instruments. Each project will be examined in the context of the *5-4-3-2-1* framework model.

The cloud computing research landscape is still evolving and this study will make a number of contributions. First, it will make a contribution to the existing literature on value creation and capture with cloud computing in that it will provide an empirical validated version of the *5-4-3-2-1* framework model proposed in this study. The contribution of this framework will be threefold. First, it will be tailored towards a cloud computing partnering ecosystem. Second, the study will identify which cloud computing components are more conducive to value than others thus, awarding them a more prominent sizing in the framework. Finally, the study will provide insight into the value of discrete components of the conceptual framework that facilitate the creation of a pathway through the model, a 'visual map', that an organisation may traverse in order to create and capture value in the pursuit of competitive advantage.

Beyond this study, future research could seek to develop a set of recommended practices for enabling value creation and capture in cloud computing ecosystems.

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