



Provided by the author(s) and University of Galway in accordance with publisher policies. Please cite the published version when available.

Title	Contemporary digital business model decision making: a cloud computing supply-side perspective
Author(s)	Clohessy, Trevor; Acton, Thomas; Morgan, Lorraine
Publication Date	2017-07-27
Publication Information	Clohessy, Trevor, Acton, Thomas, & Morgan, Lorraine. (2018). Contemporary digital business model decision making: a cloud computing supply-side perspective. <i>International Journal of Networking and Virtual Organisations</i> , 19(1), 1-20. doi: 10.1504/IJNVO.2019.10003812
Publisher	Inderscience Publishers
Link to publisher's version	<a href="https://dx.doi.org/10.1504/IJNVO.2019.10003812">https://dx.doi.org/10.1504/IJNVO.2019.10003812</a>
Item record	<a href="http://hdl.handle.net/10379/7504">http://hdl.handle.net/10379/7504</a>
DOI	<a href="http://dx.doi.org/10.1504/IJNVO.2019.10003812">http://dx.doi.org/10.1504/IJNVO.2019.10003812</a>

Downloaded 2023-03-31T18:46:10Z

Some rights reserved. For more information, please see the item record link above.



---

## Contemporary digital business model decision making: a cloud computing supply-side perspective

---

Trevor Clohessy\*, Thomas Acton and  
Lorraine Morgan

Business Information Systems Department,  
JE Cairnes School of Business and Economics,  
National University of Ireland,  
Galway, Ireland

Email: trevor.clohessy@nuigalway.ie

Email: thomas.acton@nuigalway.ie

Email: lorraine.morgan@nuigalway.ie

\*Corresponding author

**Abstract:** Cloud computing is an example of a promising technological paradigm which possesses the potential to act as a catalyst to drive radical innovations in the development of the networked society. While some information and communication technology (ICT) providers have reaped the rewards by transitioning from antiquated hardware and service provision to more propitious cloud-based service provision methods, others have experienced substantial difficulties related to the formulation and operationalisation of effective business models. This paper presents a research framework which can serve as a lens for exploring how digital organisations can execute their core business model decisions along increasingly specific decision making levels. Taking the perspective of an exemplar established large ICT provider, our study uses the research framework in order to provide new insight for facilitating cloud computing supply-side business model effectiveness.

**Keywords:** business model; decision making; cloud computing; ICT provider.

**Biographical notes:** Trevor Clohessy is a Lecturer who manages both undergraduate and post-graduate research led courses which focus on digital transformation and the impact of digital technologies such as big data, cloud computing, IoT and Blockchain. In conjunction to organising both national and international academic and practitioner workshops and panels, he is also an OpenSym international open collaboration conference track committee member and an editorial advisory member for the *Irish Business Journal*.

Tom Acton is the Head of School of Business and Economics, and a Lecturer in Business Information Systems at NUI, Galway, Ireland. His research interests are cloud computing, decision support systems and mobility. He holds a PhD degree on Decision Support for Small-Screen Information Systems. He has a number of journal publications, book chapters and conference papers. Recently he served as the Vice Dean for Teaching and Learning, an Associate Head of Teaching and Learning for the School of Business and Economics, and

Head of the Business Information Systems discipline. He also served as an Associate Editor on a number of journals, including the *European Journal of Information Systems (EJIS)* and the *Journal of Theoretical and Applied E-Commerce Research (JTAER)*.

Lorraine Morgan is a Lecturer and a researcher with Lero: The Irish Software Research Centre, Ireland. She has been involved in a number of collaborative research projects involving international and national-based industry partners, attracting over €20 m in funding. She is currently involved in the development of an industry-focused network of excellence around open and inner source software. Her research has also been published in leading journals including the *Journal of Strategic Information Systems*, *European Journal of Information Systems*, *Database for Advances in Information Systems and Information and Software Technology*.

This paper is a revised and expanded version of a paper entitled 'Running while standing still: rethinking ICT business model decisions for the new cloud economy' presented at 29th Bled e-Conference, Bled, Slovenia, 19 June 2016.

---

## 1 Introduction

Cloud computing is an example of a promising information and communication technology (ICT) which possesses the potential to “revolutionize the mode of computing resource and application deployment breaking up traditional value chains and making room for new business models” (Leimeister et al., 2010). From a cloud service user perspective, the case for adopting cloud technologies is compelling (see Marston et al., 2011; HBR and Verizon, 2014; Clohessy et al., 2013, 2014). However, established large ICT providers are concurrently experiencing substantial difficulties in their attempts to effectively leverage the transformational business capabilities afforded by cloud computing (Conboy and Morgan, 2012; Linthicum, 2012; Da Silva et al., 2013; Clohessy et al., 2016b). This is notable evidenced by consecutive lacklustre quarterly performances by companies such as IBM, Hewlett Packard, Intel and so on. Cloud computing enables ICT providers (person, organisation or entity responsible for making a service available to cloud consumers) to virtualise their computational resources and concurrently provision them, via a service orchestration process, typically in the form of software-as-a-service (SaaS), or platform-as-a-service (PaaS) or infrastructure-as-a-service (IaaS) (Liu et al., 2011). International surveys of ICT providers have identified that a lack of business model innovation (CSA and ISACA, 2012) and an inability to produce compelling business cases for customers (KPMG, 2012) represented salient challenges which are currently stagnating customer adoption of cloud technologies. Moreover, extant research demonstrates how ICT providers are currently experiencing substantial difficulties in their attempts to effectively leverage the transformational business capabilities afforded by cloud computing (Gerdeman, 2013; Clohessy et al., 2016a; Weins, 2016). According to Linthicum (2012), “the core problem is that most ICT providers believe what they do is innovative. To them, that means adopting the strategies of the market leaders, replicating their features and APIs (call for call), and hyping the market”. The author argues that while such as a ‘fast follower’ ethos may have worked effectively in the past, modern technological savvy business customers

require concrete assurances pertaining to the business value of adopting a cloud computing solution. As “cloud computing is often heralded as the silver bullet that can provide business benefits regardless of their size and geographical scope, it is no wonder that many large corporations simply accept these assumptions as true” (Winkler et al., 2014). The transformation of extant mature business models to cloud-based business models encompasses potential nuanced legacy liabilities and issues. In order for larger organisations to derive cloud related benefits they often have to challenge these assumptions and cultivate their own pathways to cloud success.

Existing research articulates that an organisation’s ability to successfully commercialise early-stage digital technologies, while concurrently differentiating themselves from rival organisations, is largely dependent on their ability to repeatedly execute tactical business model decisions in the face of rapidly evolving digital market landscapes (Porter, 1996; Teece, 2010). In the context of provisioning cloud computing, this ability is crucial as ICT providers’ business model arrangements are in a constant state of flux due to the evolving cloud technology landscape (Ojala and Tyrvaïnen, 2011). This is also compounded by an increasingly overcrowded marketplace and the customer-oriented nature of provisioning cloud technology (Iyer and Henderson, 2010; Marston et al., 2011; Clohessy et al., 2016b). Currently, the extant literature’s understanding of organisational business models and its relationship with cloud computing is still limited (Ehrenhofer and Kreuzer, 2012; Khanagha et al., 2014; Clohessy et al., 2016b). Additionally, to the best of our knowledge, no research exists which has explored this impact of cloud computing from a large business model mature (e.g., extant pre-cloud business models) ICT providers’ multi-level decision making perspective. Additionally the cloud computing paradigm has reached a level of maturity which lays the foundation for researchers to investigate how ICT providers have moulded and sustained their cloud computing business arrangements over time (Iyer and Henderson, 2012). Thus, the objective of this paper is to explore:

- How an established large ICT provider formalises cloud-based business model decisions in order to sustain their competitiveness.

Specifically, we present a decision making focused business model research framework which we subsequently use in a case study of an exemplar ICT provider in order to shed light on our research objective. This paper is in line with the concept of ‘consumable research’, as proposed by Robey and Markus (1998), being both academically rigorous and relevant to practice.

The remainder of the paper is structured as follows: in Section 2, the paper builds the theoretical foundation for the study. Section 3 describes the business model decision making research framework operationalised in the study. Section 4 outlines the study’s research method. This is followed by a presentation of the study’s findings in Section 5. Finally, the paper concludes in Section 6 with a discussion. The study implications, limitations and recommendations for further work are also presented.

## 2 Literature review: bounding the cloud computing and business model concepts

### 2.1 The cloud computing concept

Cloud computing encompasses a recombination of existing and new technologies and has built its foundations “on decades of research in virtualization, distributed computing, utility computing, networking and more recently web and software services” (Vouk, 2008). The cloud computing paradigm differentiates itself from antecedent ICT paradigms via five essential characteristics: *rapid elasticity*, *measured service*, *broad network access*, *resource pooling*, and *on-demand-self-service*. While these five essential characteristics represent attractive business value for ICT providers, our understanding of how these organisations can develop and sustain business models that effectively align with these characteristics is still limited (Chang et al., 2013; Khanagha et al., 2014; Clohessy et al., 2016b). These essential characteristics, are typified and converged in the widely cited definition presented by Mell and Grance (2011) as that proposed by the American National Institute of Standards and Technology (NIST), describing cloud computing 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. This description for the continually evolving cloud computing paradigm is “intended to serve as a means for broad comparisons of cloud services and deployment strategies, and to provide a baseline for discussion from what is cloud computing to how to best use cloud computing” (Mell and Grance, 2011). In order to encapsulate the increasing number of new service models coming onto the market [e.g., business process as a service (BPaaS), desktop as a service (DaaS), communication as a service (CaaS), and so on], we have incorporated an *anything as a service (XaaS)* element (see Clohessy et al., 2016a) into the NIST conceptualisation. It is this delineation of the evolving cloud computing paradigm that is employed in this paper (Table 1).

**Table 1** Conceptualisation of the cloud computing concept

<i>Essential characteristics</i>	<i>Deployment models</i>	<i>Service models</i>
On demand self-service	Community cloud	Software as a service (SaaS)
Broad network access	Private cloud	Platform as a service (PaaS)
Resource pooling	Public cloud	Infrastructure as a service (IaaS)
Rapid elasticity	Hybrid cloud	Anything as a service (XaaS)
Measured service		

Source: Adapted from Mell and Grance (2011)

## 2.2 The business model concept

For more than a decade, the business model concept has been used extensively in research to examine how organisations can create and capture value with new digital technologies (e.g., the internet, ecommerce applications, mobile applications, cloud technologies and so on). Driving factors such as the emerging knowledge economy, the restructuring of global financial services, increased outsourcing of business processes, rapid advancements in ICT and the repeated failure of organisations to capitalise on the capabilities afforded by these ICTs have catapulted the business model concept back into the public arena (Teece, 2010; Zott et al., 2011). Morris et al. (2005) illustrate how transaction cost economics, value chain/value system, resource-based view of the firm, dynamic capabilities and Schumpeterian innovation represent fundamental concepts which have shaped our current understanding of what a business model is today. In modern business environments, as organisations integrate ICT and associated propitious digital technologies into their everyday business processes, they are simultaneously enabling a shift from traditional business models to “combined physical and virtual models” (Weill and Vitale, 2002). This business model metamorphosis, if not managed solicitously, is strewn with many abrogating repercussions, as evidenced by the demise of corporate giants such as Blockbuster, Kodak, Circuit city, RadioShack and so on. Moreover, over 25 years ago, Hopper (1990) discussed the strategic significance of the unprecedented advancements in technology for organisations, proclaiming that “the consequences of falling behind are so irreversible, companies with either master and remaster the technology or die”. The author predicted that innovative technology would level the competitive playing field for many organisations thus making it increasingly difficult to achieve competitive differentiation. However, there is evidence to suggest that organisations who execute superior business model decisions can create robust business models which can concurrently compete and out manoeuvre rival organisations during even the most turbulent periods of digital disruption (Teece, 2010; Osterwalder and Pigneur, 2010).

The extant literature is in general consensus that the business model is a multi-faceted concept whereby a business model can:

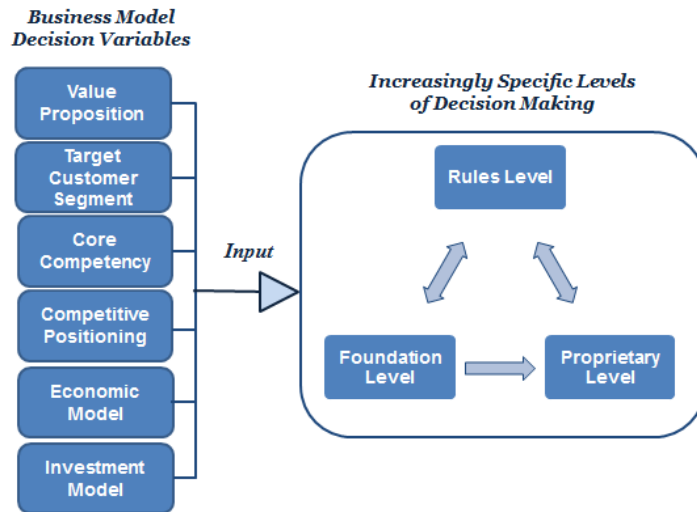
- 1 serve as a holistic, system-level approach at characterising how an organisation does business, the concepts of value creation and capture and the activities that take place between the focal organisation and its partners (Teece, 2010; Zott et al., 2011)
- 2 represent an ‘architectural blueprint’ for the formation and execution of an organisation’s IT strategic objectives (Rajala et al., 2003; Pateli and Giaglis, 2003; Richardson, 2008; Zott and Amit, 2008)
- 3 serve as a ‘conceptual tool of alignment’ to fill the gap between corporate strategy and business processes in order to provide a crucial harmonisation among these organisational layers (Al-Debei and Avison, 2010; Osterwalder and Pigneur, 2010)
- 4 assist organisation’s to successfully leverage and commercialise early stage promising digital technologies in order to achieve sustainable competitive advantage (Chesbrough and Rosenbloom, 2002; Rajala and Westerlund, 2007).

For the purpose of this study, we have adapted an existing business model framework (Morris et al., 2005) which embodies all of these aforementioned business model attributes, for elucidating the paper’s research objective. In the next section, we delineate the main components of the research framework. We also outline the main reasons for using this conceptualisation for the business model concept.

### 3 Business model decision making research framework

Morris et al. (2005) investigated the core components of a business model and proposed a rigorous integrative framework which delineates how a “business model comprises the concise representation of how an interrelated set of six core business model decision variables, in the areas of venture strategy, architecture, and economics, are addressed to create sustainable competitive advantage in defined markets”. We have adapted this framework (see Figure 1) to conceptualise how an established ICT providers have crafted their business models. The left-handside of the framework contains business model components which are typical to all business models. These components feed into the right-handside of the framework which contains increasing specific levels of decision making. Organisations can mould customised decision making configurations for each individual business model component.

**Figure 1** Study conceptual framework (see online version for colours)



Source: Adapted from Morris et al. (2005)

The first business model decision variable (DV) addresses the value proposition (how an organisation creates value). Organisations operating in voracious business environments are constantly striving to meet customer’s multifarious demands by developing unique innovative value propositions in their endeavours to yield a profit. A value proposition constitutes an aggregation, or bundling, of products or services that create value for a particular customer segment (Osterwalder and Pigneur, 2010). Value

propositions may be quantitative (service speed, price) or qualitative (offering design, customer experience). The second DV addresses target customer segments (for whom the organisation will create value). This question addresses defining the market in which the organisation intends to sell their offering and their positioning in a value chain. The third decision is concerned with the economic model (how the organisation generates revenue). An organisations long-term success and longevity is dependent on the successful implementation of “commercially viable architectures for revenues and costs” (Teece, 2010). Two closely related DVs include core competency (internal capabilities or skill set which differentiates an organisation from others) and competitive positioning (how the organisation intends to position itself in the market). Competitive positioning can be achieved through operational effectiveness or strategic positioning. Operational effectiveness involves an organisation utilising superior technologies, superior raw materials, superior management structures, and highly trained staff in order to differentiate themselves from competitors. Strategic positioning involves organisations producing unique value to customers by adopting a novel approach to other competitors. This novel approach may take the form of different logistical arrangements, provisioning distinctive features, provisioning distinctive catalogue of services and so on. The final decision area addresses the investment model (organisation time, scope and size ambitions). Examples of investment models include subsistence, income, growth and speculative models.

These business model DVs can serve as input for execution at three increasingly specific levels of decision making. At the foundation level, basic decisions concerning the general characteristics of what the business is and what the business is not are addressed. The proprietary level applies unique combinations of business model DVs in order to achieve a competitive advantage. This level can serve as a customisable tool, which enables organisations to focus on means of creating and capturing unique value in each of the six business model decision areas. Whereas the foundation level can be easily replicated by competitors, the proprietary level cannot due to the interaction of the individual business model components entrenched within that level. Finally, the rules level enables the alignment of operative rules with the foundation and proprietary levels to ensure long-term success (e.g., delineates governing principles regarding decisions executed at the foundation and proprietary levels).

This research framework is appropriate for conceptualising how established ICT providers have crafted their business model decisions, for the following reasons. First, the framework is comprehensive, coherent and comprises constructs which are similar to other widely cited business models frameworks such as the business model canvas (Osterwalder and Pigneur, 2010). Second, the framework is also dynamic in nature as it encapsulates external factors of influence in terms of market dynamics, technological advancements and regulatory changes which all represent salient factors in the context of provisioning cloud computing technologies. Finally, a core element which differentiates this framework from other existing theoretical approaches, which merely provide a static snapshot of an organisation’s business activities at a given moment in time, are three increasingly specific levels of decision making (foundation, proprietary and rules). These three levels can serve as a customisable iterative tool for executing the six business model DVs in the pursuit of creating sustainable competitive advantage.



## **4 Methodology**

### *4.1 Research instrument development*

The central objective of the following study is to determine how an established large ICT provider formalises cloud-based business model decisions in order to sustain their competitiveness. Due to the dearth of existing research into the focal research phenomena, this study adopts a case study approach. Due to the nuances of the focal phenomena under scrutiny in conjunction with the dearth of previous research, a process of theoretical sampling was used in order to determine the appropriate study sample size. Data was collected until no major new insights were being gained, at which point theoretical saturation was deemed to have been reached (Corbin and Strauss, 2008). An interview protocol was prepared based on all of the elements encompassed within the research model depicted in Figure 1. The interview protocol was designed to primarily focus on eliciting contextual knowledge from the interviewees in order to clarify and deliberate about the focal phenomena. For example, while the observation of how cloud technology works is important, knowledge of detailed narratives and concrete examples of why a cloud technology is being used or not being used facilitated the elucidation of salient insight. A pre-test was carried out with several members of the target population. This enabled the researchers to detect any ambiguities the participants had in answering the questions. Based on the results, the protocol was adapted iteratively. Following the fourth iteration, no further revisions occurred.

### *4.2 Interviewee participant selection*

The research interview sampling was directed by evolving theoretical concepts, whereby the researchers identified a ICT provider and interviewees from which we expected to elicit the majority of insights into the phenomena of interest (Strauss and Corbin, 1998). Data collection took place between January 2015 and August 2015. The study followed the standard practice of involving senior management as data sources for cloud computing IS research (Iyer and Henderson, 2012; Clohessy et al., 2016b). As such, the interviewees were selected based on the following criteria: first, the person should have experience working with cloud technology. Second, the person should hold a managerial position which would enable them to have an in-depth knowledge of the business model intricacies of their cloud operations. Third, the person should preferably have responsibility for overseeing their organisation's business model. Each interview was recorded (pending permission) and annotated. In order to improve the credibility of the data and provide cross and complementary perspectives on emerging elements, supplementary evidence in the form of archival documents and published materials sourced from the ICT providers' websites (e.g., white papers, specific case studies, brochures, reports) was also analysed (Table 1). This form of document analysis constitutes natural occurring evidence and serves as a cogent complement to interviews (Silvermann, 1993). Moreover, using several data sources and measures of phenomena provide cross-checks on data accuracy (Denzin, 2012) and enrichment of the conclusions presented by the researchers (Harrigan, 1983).

### 4.3 Data analysis

While the study did not undertake a grounded theory approach, in analysing the data, the researchers used an analytical hierarchical data analysis process adopted from Ritchie et al. (2003) incorporating open and axial coding techniques based upon the recommendations of Strauss and Corbin (1998). The hierarchical data analysis procedure used was an iterative process whereby as “categories are refined, dimensions clarified, and explanations are developed, there is a constant need to revisit the original or synthesized data to search for new clues, to check assumptions or to identify underlying factors” (Ritchie et al., 2003). The researchers engaged in a process of ‘conceptual scaffolding’ whereby the overall objective of this hierarchical approach was to move from tentative descriptive accounts to more established explanatory accounts which were used to formalise theory (Ritchie et al., 2003). The researchers used NVivo 10 software in order to analyse and structure all of the qualitative data collated and to ensure the traceability of the coding evolution.

### 4.4 Case background

The case study served to:

- 1 Illuminate the study’s central research objective.
- 2 Identify ambiguities contained within the research instrument.
- 3 Identify issues which point to salient variables for further investigation. The case is an established large (> 10,000 employees) multi-national business model mature ICT service provider who has been at the forefront of the advancement and provision of cloud computing technologies for the past five years.

**Table 2** Primary and secondary data sources

<i>Primary data sources</i>				
<i>Interviewee role</i>	<i>Interview duration</i>	<i>Type</i>	<i>Code</i>	
Senior cloud architect	62 mins	Face to face	A1	
Cloud product manager	75 mins	Video conference	A2	
Cloud R&D director	87 mins	Face to face	A3	
Cloud strategy leader	120 mins	Face to face	A4	
Cloud technology officer	92 mins	Face to face	A5	
Cloud data centre manager	60 mins	Face to face	A6	
Senior cloud engineer	77 mins	Video conference	A7	
Cloud EMEA leader	83 mins	Video conference	A8	
Senior cloud technologist	74 mins	Face to face	A9	
Cloud data centre manager	93 mins	Face to face	A10	
<i>Secondary data sources</i>				
Case websites, white papers and marketing materials	Annual and quarterly reports	Company presentations, Blogs, YouTube, Webinars and Podcasts	Industry commentary and analysis and newspaper articles	Researcher notes and memos

For company confidentiality, we will pseudonymously refer to the company as ‘alpha’. Alpha’s business model has sustained company technological growth for the past 30 years and the company have consistently featured in Gartner’s magic quadrant for provisioning cloud technology. Thus, the organisation is very suitable for operationalising our research model as a means of exploring our research objective. Data was collected on site through ten semi-structured, face to face and video conference interviews with senior managers (Table 2). The participating interviewees were employed by the firm for an average of ten years and had an average of 20 years IT service experience. Interviews were recorded in instances where permission was granted by the interviewee. The interviews ranged in duration from 60 to 120 minutes. Extensive field notes and observations were compiled immediately following each interview. The interviews were then later transcribed.

## 5 Operationalising the framework

In this section, the empirical results are presented. Figure 2 depicts Alpha’s business model transformation since the organisation first commenced provisioning cloud services in 2010. Table 3 portrays how Alpha is strategically operationalising their business model DVs along the *foundation, proprietary and rules* decision making levels (DML).

**Table 3** An overview of alpha’s business model decision making process

DML	Foundation level	Proprietary level	Rules level
DV			
Value proposition	Scalability Disaster recovery Transparency Remote access Agility Direct rapid provision	Enterprise grade security, elasticity and availability. Self-service and fully managed cloud offerings. Breadth and depth of cloud services portfolio and API’s.	Combine existing legacy product and service offerings with new cloud enabled ones to create unique value propositions for customers.
	Business competitive advantage and innovation CAPEX to OPEX.	Offer SLA’s with 99.9% uptime guarantees. Provision of customised ROI and migration strategies. Security assessment and strategy roadmap. Offer a 30 day trial period; Service customisation. Customers can build their own private and hybrid clouds – it is the cloud the way you want it. Open source standards and platforms. Provision sandbox platforms enable CSU to experiment with cloud technologies.	Emphasise customised nature of cloud offerings. Onboard new cloud customers in less than _ hrs/days. Maximum cost of on boarding customers should not exceed Eur €_.

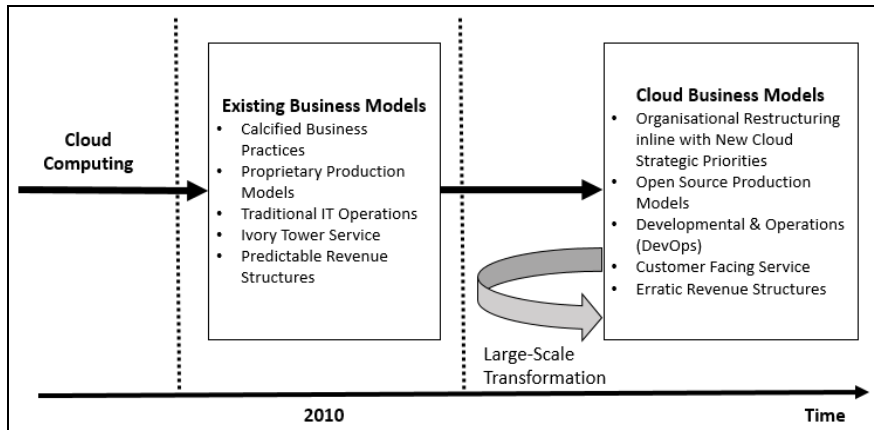
**Table 3** An overview of alpha’s business model decision making process (continued)

<i>DML</i> <i>DV</i>	<i>Foundation level</i>	<i>Proprietary level</i>	<i>Rules level</i>
Target customer segments	Broad market B2C, B2B and B2G (Sell to consumers, SME’s, non-profit, large multinationals and governments)	Managed evolution from a leading traditional hardware and software manufacturer to a leading international ICT provider. Targeted focus on SME’s and large multi nationals. Careful selection of business partners to expand. Strategically acquire cloud companies to facilitate the targeting of new markets.	Specific guidelines for selecting business partners. Specific guidelines for acquiring cloud companies. Achieve at least _ customers per day/month/year. Retain at least _ customers per month/year.
Core competency	Technology R&D capability Innovation Operational excellence.	Departments specifically tasked with migrating legacy software applications to SaaS. R&D labs specifically tasked with experimenting with cloud-based technologies. Invest in new global data centres. Use of existing hardware and software Infrastructure – data centres and legacy software applications. Careful selection of business partners to innovate and mitigate risks.	New software offerings must be developed as SaaS only. Specific guidelines for acquiring cloud companies. Develop _ new SaaS offerings per/month/year. Migrate _ existing software applications to SaaS per/month/year. Test _ cloud specific technologies per month/year.
Competitive positioning	Image of operational excellence Software heritage Industry experience Service quality – consistency, security and dependability.	Differentiation is achieved by stressing that the Alpha’s heritage and operational excellence enables them to be first to the market with cloud technologies which are robust, scalable, highly available and secure. The company has strengthened its competitive positioning in the cloud market via a number of recent strategic acquisitions.	Become the world’s most essential cloud company. Emphasise company heritage and experience. Specific guidelines for acquiring cloud companies.

**Table 3** An overview of alpha’s business model decision making process (continued)

<i>DV</i> \ <i>DML</i>	<i>Foundation level</i>	<i>Proprietary level</i>	<i>Rules level</i>
Economic model	Multiple revenue sources Monthly billing Licensing fees	Targeted focus on business process outsourcing, IT services management and consulting services revenues. Cloud financing option to enable CSU spread the up-front costs of cloud services over time.	Maintain costs per customer below Eur €_
Investment model	Growth model	Emphasis on growth opportunities that are consistent with strategy	Managed rate of growth

**Figure 2** Alpha’s business model metamorphosis (2010 to present)



5.1 The foundation level: getting the basics right

At the foundation level, the focus is centred on defining the six core business model DVs which all enterprises must address. This level defines what the organisation is doing, as opposed to how it is doing it. Thus, it enables the generalisation across ICT providers in order to capture the essence of their cloud business models. The main danger for early stage cloud providers is “that they have this rough implicit idea of what their business model is” (A1). However, by constantly “pushing similar value propositions and pricing mechanisms to other service providers” (A6), they fall short of ever evolving their basic business model beyond the foundation level. When the company first started provisioning cloud technology, it “afforded the organization a brief period of success, it was clear that, prior to jumping in the deep end of the cloud ocean” (A10), the company would have “to innovate their business model in a way which would be hard to replicate by competitors” (A4). Prior to adopting cloud technology, Alpha’s business models gravitated towards the development of consumer technologies and the provision of professional business services such as IT consulting. Alpha have has specifically focused on business markets,

in particular, larger enterprises clients, which encompass high margins and low growth levels. The study participants revealed that the primary reason for the company deciding to provision cloud technologies was motivated by fundamental changes that were occurring across the technological industry landscape. “Around 2010, the strategy of the organization was to re-orientate itself towards provisioning technology as a consumable service e.g., IT as a service (ITaaS) as there were indicators this was the way the industry was going. The company were witnessing a growing need for scalable elastic computational resources based services” (A5). Cloud computing has rendered Alpha’s traditional method of technology service provisioning obsolete. The analysis reveals that in the past five years, alpha has undergone a large scale transformation. They are currently restructuring the company so that cloud technology touches on every element of their business practices. The analysis also reveals that the increasing demand from customers for customisable cloud services has resulted in both organisations having to transform from their ‘ivory tower’ service centric mentality to a ‘customer-facing’ service centric philosophy. The participants acknowledged how this transformation has coincided with the increasingly interoperable and service-orientated nature of cloud services and the popularity of hybrid cloud deployment models. Alpha’s traditional business models encompassed table, predictable revenue arrangements and growth levels. However, the company have had to develop innovative means of coping with the unstable and uncertain revenue arrangements and growth levels encompassed within their cloud computing business models. In order to migrate to the next proprietary level Alpha have had to evaluate consistencies and trade-offs between the business model decisions.

### 5.2 *The proprietary level: out manoeuvring rivals*

Next, the proprietary level reflects the manner with which Alpha has applied unique innovative configurations to the foundation level components in order to differentiate itself from competitors and sustain their competitive advantage in the cloud market. Whereas the *foundation level* is generic, the *proprietary level* is strategy specific. Specifically, the *proprietary level* focuses on alpha’s core competencies and competitive positioning DVs which make possible a range of unique value propositions (e.g., breadth and depth of cloud portfolio services/API and service customisation capabilities and so on). For decades “Alpha have been first to the market with technologies which are robust, scalable, highly available and secure, that is the route of our software heritage, ultimately it is what differentiates us from our competitors. The depth and breadth of Alpha’s cloud offerings really distinguish the company from other ICT providers” (A3). Alpha possesses “a lot of core expertise to call upon in order to develop state of the art cloud offerings. They strategically develop teams to ensure that they are competent in cloud, mobile and analytics. As every business case is different, the learning process with cloud technologies is a constantly evolving one” (A2). Alpha “are investing vast amounts into the configurability of their cloud services. Customers must be able to configure and customise cloud modules as they see fit” (A9). While the provision of cloud technologies constitutes one of the company’s core competency areas, “as the company continue to sell cloud products they are learning and evolving organically based on those experiences” (A8).

Alpha’s business partners constitute key differentiators that provide cogent value to their business model stating, “the business partners have always played a very valuable role in making large companies work for smaller companies” (A6). The company have

also recently partnered with a number of competitor service providers. These strategic partnerships, which would have been unthinkable in the past, are necessitated due to the interoperable nature of cloud technology. These partnerships “are a necessary evil, the company must evolve or perish” (A10). Alpha has also acquired a number of established ICT providers in an effort to maximise their market penetration. The company’s recent acquisition of an already established and highly successful IaaS ICT provider has enabled the company “to rapidly innovate our SaaS and PaaS offerings and also enable the company to rapidly gain a strong foothold in the cloud market” (A4). When the company first commenced provisioning cloud computing services, their business models experienced an accelerated rate of change.

Traditionally the company have sold ICT products at a high cost (e.g., multimillion dollar, multiyear deals) to the customer. These products also encompassed long implementation phases. Thus, because of these cost and time limitations the company’s traditional customer segment was relatively small. Cloud technologies have enabled Alpha to dramatically extend their target market reach. The company can “now target SMEs, non-profit organizations and individual customers” (A1). The transition from the manufacturing of hardware and software which was then sold to globally located distributors to the provisioning of cloud services was facilitated through their ability to successfully experiment and iterate their business models. Prior to provisioning new cloud services or applications, Alpha experiments with cloud technologies in sandbox environments encompassed within their R&D laboratories. The case study has clearly demonstrated that from a ICT provider perspective, considerable scope for innovation exists within each DV when operationalised at the *proprietary level*.

### 5.3 *Rules level: establishing governance*

Finally, the establishment of operative rules not only reinforces and embeds Alpha’s overall cloud objective in the consciousness of their employees but also enables management to avoid decision making manoeuvres which may be incompatible with their business model DVs. The ethos behind Alpha’s specific rules level is that their “cloud business model decision-making strategies are all founded on agility. The company are focused on making new or improved services faster than they did in the past. All new software offerings must be cloud based and be able to be provisioned at low cost” (A9). The company are currently in the process of implementing a new breed of agile software development within the company called DevOps. The emergence of DevOps has “enabled the company to respond more effectively to customer requirements and facilitates an accelerated time to market” (A4). The analysis also reveals that DevOps methodologies were currently being driven by market forces and were pivotal for the company with regards to developing, deploying and maintaining state of the art cloud technologies. Traditional IT operations philosophies were ineffectual in enabling both the provider and the customer to derive ‘continuous’ value from cloud computing services. For example, the organisation’s traditional IT operations which encompassed agile and or waterfall methodologies worked well with regards ‘big bang’ feature releases whereby upgraded or new versions of their product offering were released on a quarterly or annual basis. However, provisioning cloud service offerings dictates that IT providers must be efficient at transporting cloud source code speedily from the software developers to the customers and be capable of reacting to the continuous feedback received. Thus, “we are currently undergoing a large scale DevOps-style restructuring at intra-organization and

inter-organizational levels (A3)". The company have also invested heavily in OpenStack cloud software development and are currently investigating the merits of releasing their own distribution of OpenStack in order to facilitate the on-boarding of customers in an accelerated manner. Alpha utilise an indigenous business modelling component technique to design governing principles so as to assist with the execution of decisions at the foundation and proprietary levels. This technique decomposes the company into strategic, operational and tactical segments in order to concurrently identify components which bring business value to the company and those that do not. This case study has demonstrated that Alpha have developed cogent operative rules which the enabled the company to gain a strong foothold in a rapidly evolving cloud market.

## **6 Discussion, study implications, limitations and future work**

### *6.1 Discussion*

This study is motivated by the increasing complexity of developing and sustaining effective business models for the new cloud economy. There is evidence to suggest that these complexities have resulted in significant challenges for large business model mature ICT providers. Ultimately, "the cloud is the latest example of Schumpeterian creative destruction: creating wealth for those who exploit it and leading to the demise of those that don't" (Weinman, 2012). History has shown that with the emergence of any new IS/IT, the inability to operationalise effective business models can threaten the longevity of even the most nascent IS/IT advancements. While extant research has examined the impact of cloud technology on adopter organisation's business models, to date, little research exists which has explored a supply-side perspective with regards to determining how ICT providers can effectively formalise business model decisions in order to sustain their competitiveness in a rapidly evolving digital ecosystem. Thus, the objective of this paper was to explore, *how an established large ICT provider formalises cloud-based business model decisions in order to sustain their competitiveness*. Using the business model decision making framework (Figure 1) and taking a post-provision perspective, the study's findings have illustrated how an exemplar ICT provider has strategically executed their business model decisions over a period of five years in order to effectively align with the novel propitious characteristics afforded by cloud computing. Moreover, the study has demonstrated how the transformation of extant mature business models to cloud-based business models encompasses potential nuanced legacy liabilities and issues. However, by executing innovative business model decisions, the case organisations have overcome substantial challenges in order to cultivate their own pathways to cloud success.

### *6.2 Theoretical implications*

The following research is valuable both from the theoretical and practical point of view. On the theory side, we make important contributions to the cloud computing literature. First, rather than taking a conventional static business model lens (e.g., business model canvas, etc.) to explore the impact of cloud computing on ICT providers' value creation and value capture processes, we have taken the nuanced step of proposing a new business model decision making perspective. This nuanced perspective provides new salient



insights into how an established large business model mature ICT provider has strategically configured their individual business model components across several increasingly specific levels of decision making. While this study explored the impact of cloud computing provision on an established ICT provider, this new business model perspective could also be used to assist organisations across a range of industry settings to craft competitive and sustainable IS/ICT enabled business models. Second, this study extends the current dearth of research which has explored the long term impact of cloud technology on organisation's business models. We have illustrated how successful large ICT providers' business models have transformed and evolved over time (e.g., five years post-provision) as a result of cloud computing technology. The study has identified that provisioning cloud services encourage business models which encompass open, develops and customer innovation led practices. Akin to the 'slow train coming' analogy provided by Willcocks et al. (2013), this study has also identified that even though the concept of cloud computing has been in existence for the past decade, the cloud technological landscape is still maturing and is currently exhibiting a rapid level of dynamism. This study has demonstrated that the impact of this technological dynamism can be minimised by operationalising effective proprietary and rule level decision making strategies.

### *6.3 Practical implications*

On the applicative side, the following practical implications are relevant. This paper has identified how a leading ICT provider has:

- 1 evolved their basic foundational business model decisions to the next proprietary level in order to compete effectively
- 2 designed effective operative rules in order to sustain their competitiveness over the past five years.

ICT providers should consider exploring their business models using the new perspective operationalised in this study in order to scrutinise their decision making methods. Moreover, while the main focus of the study encompassed the perspectives of a large business model mature ICT service provider organisation, this study should also sound out a warning to those organisations that did not fall under the umbrella of the study who are contemplating migrating to provisioning cloud technologies. Whereby, yes, the benefits of cloud-enabled business models are very appealing, however, failing to execute robust business model decisions can result in subpar business model outcomes.

### *6.4 Limitations*

The study has several limitations. First, while interviewing senior management has a number of strengths, it can also result in the manifestation of elite bias. Elite bias occurs when a researcher fails to gain a comprehensive understanding of the broader context by overweighting the data elicited from elite study participants. In order to minimise the impact of elite bias, we deployed a number of prescribed tactics in order to ensure the validity and reliability of the research design (e.g., triangulation, multiple interviews and cross-case analysis). Second, given the complexity and rapidly evolving nature of the business model and cloud computing concepts, the evolution of how ICT providers have arrived at their current mode of operating may be best observed as part of a longitudinal

study. However, as an explorative study of complex topics, our central objective in this work is to explore the dynamics of their relationships. Finally, given that the findings are based on a single organisation, this study is naturally limited in terms of its generalisability. However, we took care in relating the idiographic details of the study findings to theoretical concepts. Additionally the primary aim of this case study, which forms part of a larger study, is to inform the next phase of our research.

### 6.5 Further work

The research framework operationalised in this study could be used to decipher the impact of other emerging technologies on business models (e.g., big data, the internet of things and 3D printing business models). Future research should also focus on the roles organisational culture, business processes, governance structure (e.g., centralised, decentralised) and leadership style assume in the business model decision making formulation process. We also trust that this study will serve as a basis for future qualitative and quantitative research that can be undertaken to confirm and extend our study. For example, future research could explore tensions encompassed within ICT providers' foundation, proprietary and rules levels which are currently inhibiting the organisations' executing effective business model decisions. Also, while this study focused on the provider perspective, future research could also provide important insights from the customer/adopter perspective. Moreover, future research might investigate the perspective of other stakeholders encompassed within cloud computing value network (e.g., consultants, brokers, consumers, etc.). Additional case studies or industry surveys should be conducted across other cases in different industries.

### Acknowledgements

This work was supported with the financial support of the Science Foundation Ireland grant 13/RC/2094 and co-funded under the European Regional Development Fund through the Southern and Eastern Regional Operational Programme to Lero – the Irish Software Research Centre ([www.lero.ie](http://www.lero.ie)).

### References

- Al-Debei, M.M. and Avison, D. (2010) 'Developing a unified framework of the business model concept', *European Journal of Information Systems*, Vol. 19, No. 3, pp.359–376.
- Chang, V., Walters, R.J. and Wills, G. (2013) 'The development that leads to the cloud computing business framework', *International Journal of Information Management*, Vol. 33, No. 3, pp.524–538.
- Chesbrough, H. and Rosenbloom, R. (2002) 'The role of the business model in capturing value from innovation: evidence from the Xerox Corporation's technology spin-off companies', *Industrial and Corporate Change*, Vol. 11, No. 3, pp.529–555.
- Clohesy, T., Acton, T. and Coughlan, C. (2013) 'Innovating in the cloud', *International Journal of Innovations in Business*, Vol. 2, No. 1, p.29.

- Clohessy, T., Acton, T. and Morgan, L. (2014) 'Smart City as a Service (SCaaS): a future roadmap for e-government smart city cloud computing initiatives', *Proceedings of the 2014 IEEE/ACM 7th International Conference on Utility and Cloud Computing*, IEEE Computer Society, December, pp.836–841.
- Clohessy, T., Acton, T. and Morgan, L. (2016a) *The Impact of Cloud Computing on IT Service Providers' Business Models*, National University of Ireland Galway PhD Dissertation, March.
- Clohessy, T., Acton, T., Morgan, L. and Conboy, K. (2016b) The times they are A-changin for ICT service provision: a cloud computing business model perspective', *24th European Conference in Information Systems (ECIS)*, Istanbul, Turkey.
- Conboy, K. and Morgan, L. (2012) 'Assimilation of the cloud: challenges to acceptance, routinisation and infusion of cloud computer', *Proceedings of the 33rd International Conference on Information Systems*, ICIS, Florida, December.
- Corbin, J. and Strauss, A. (2008) *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 3rd ed., Sage, Los Angeles, USA.
- CSA and ISACA (2012) *Cloud Computing Market Maturity* [online] <https://cloudsecurityalliance.org/media/news/cloud-maturity-study-reveals-top-issues/> (accessed 4 February 2016).
- Da Silva, C.M., Trkman, P., Desouza, K. and Lindič, J. (2013) 'Disruptive technologies: a business model perspective on cloud computing', *Technology Analysis & Strategic Management*, Vol. 25, No. 10, pp.1161–1173.
- Denzin, N.K. (2012) 'Triangulation 2.0', *Journal of Mixed Methods Research*, Vol. 6, No. 2, pp.80–88.
- Ehrenhofer, C. and Kreuzer, E. (2012) 'The role of business model design in the service engineering process: a comparative case study in the field of cloud computing to join service engineering with business model design', Paper presented at *SRII Global Conference*.
- Gerdeman, D. (2013) *Consumer Cloud Market Grows Rapidly, Providers Face Many Challenges* [online] <http://searchtelecom.techtarget.com/feature/Consumer-cloud-market-grows-rapidly-providers-face-many-challenges> (accessed 28 January 2016).
- Harrigan, K. (1983) 'Research methodologies for contingency approaches to business strategy', *Academy of Management Review*, Vol. 8, No. 3, pp.398–405.
- HBR and Verizon (2014) *Business Agility in the Cloud* [online] <http://www.verizonenterprise.com/news/2014/07/cloud-computing-survey-business-agility> (accessed 5 January 2016).
- Hopper, M.D. (1990) 'Rottling Sabre – New Ways to compete on information', *Harvard Business Review*, Vol. 68, No. 4, pp.118–125.
- Iyer, B. and Henderson, J. (2010) 'Preparing for the future: understanding the seven capabilities of cloud computing', *MIS Quarterly Executive*, Vol. 9, No. 2, pp.117–131.
- Iyer, B. and Henderson, J. (2012) 'Business value from clouds: learning from users', *MIS Quarterly Executive*, Vol. 11, No. 1, pp.51–60.
- Khanagha, S., Volberda, H. and Oshri, I. (2014) 'Business model renewal and ambidexterity: structural alteration and strategy formation process during transition to a cloud business model', *R and D Management*, Vol. 44, No. 3, pp.322–340.
- KMPG (2012) *Breaking Through the Cloud Adoption Barriers* [online] <https://goo.gl/YHO7l6> (accessed 9 March 2016).
- Leimeister, S., Böhm, M., Riedl, C. and Krcmar, H. (2010) 'The business perspective of cloud computing: actors, roles and value networks', *18th European Conference on Information Systems (ECIS)*, Pretoria, South Africa.
- Linthicum, D. (2012) *Buyers Say The Cloud Is Already Tired Out* [online] <http://www.infoworld.com/d/cloud-computing/buyers-say-the-cloud-already-tired-out-203760> (accessed 10 March 2016).
- Liu, F., Tong, J., Mao, J., Bohn, R., Messina, J., Badger, L. and Leaf, D. (2011) *NIST Cloud Computing Reference Architecture*, NIST Special Publication, Vol. 500 (2011), p.292.

- Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J. and Ghalsasi, A. (2011) 'Cloud computing – the business perspective', *Decision Support Systems*, Vol. 51, No. 1, pp.176–189.
- Mell, P. and Grance, T. (2011) *The NIST Definition of Cloud Computing*, NIST Special Publication, Vol. 800, No. 145, pp.1–3.
- Morris, M., Schindehutte, M. and Allen, J. (2005) 'The entrepreneur's business model: toward a unified perspective', *Journal of Business Research*, Vol. 58, No. 6, pp.726–735.
- Ojala, A. and Tyrvaïnen, P. (2011) 'Developing cloud business models: a case study on cloud gaming', *IEEE Software*, Vol. 28, No. 4, pp.42–47.
- Osterwalder, A. and Pigneur, Y. (2010) *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*, Wiley.
- Pateli, A. and Giaglis, G. (2003) 'A framework for understanding and analysing e-business models', Paper presented at *Bled Electronic Commerce Conference*.
- Porter, M.E. (1996) 'What is strategy?', *Harvard Business Review*, Vol. 74, No. 6, pp.61–78.
- Rajala, R. and Westerlund, M. (2007) 'Business models a new perspective on firms' assets and capabilities: observations from the Finnish software industry', *The International Journal of Entrepreneurship and Innovation*, Vol. 8, No. 2, pp.115–126.
- Rajala, R., Rossi, M. and Tuunainen, V.K. (2003) 'A framework for analyzing software business models', Paper presented at *Proceedings of 11th European Conference on Information Systems*, New Paradigms in Organizations, Markets and Society.
- Richardson, J. (2008) 'The business model: an integrative framework for strategy execution', *Strategic Change*, Vol. 17, Nos. 5–6, pp.133–144.
- Ritchie, J., Spencer, L. and O'Connor, W. (2003) 'Carrying out qualitative analysis', *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, pp.219–262.
- Ritchie, J., Lewis, J. and Elam, G. (2003) 'Qualitative research practice: a guide for social science students and researchers', in Ritchie, J. and Lewis, J. (Eds.): *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, Sage, London; Thousand Oaks; New Delhi, India.
- Robey, D. and Markus, M.L. (1998) 'Beyond rigor and relevance: producing consumable research about information systems', *Information Resources Management Journal (IRMJ)*, Vol. 11, No. 1, pp.7–16.
- Silvermann, D. (1993) *Interpreting Qualitative Data*, Sage Publications, London, UK.
- Strauss, A. and Corbin, J. (1998) *Basics of Qualitative Research: Procedures and Techniques for Developing Grounded Theory*, Sage, Thousand Oaks, CA.
- Teece, D. (2010) 'Business models, business strategy and innovation', *Long Range Planning*, Vol. 43, No. 2, pp.172–194.
- Vouk, M. (2008) 'Cloud computing issues, research and implementations', *Journal of Computing and Information Technology*, Vol. 16, No. 4, pp.235–246.
- Weill, P. and Vitale, M. (2002) 'What IT infrastructure capabilities are needed to implement e-business models', *MIS Quarterly Executive*, Vol. 1, No. 1, pp.17–34.
- Weinman, J. (2012) *Cloudonomics: The Business Value of Cloud Computing*, John Wiley & Sons, Hoboken, New Jersey, USA.
- Weins, K. (2016) 'Cloud computing trends', *2016 State of the Cloud Survey* [online] <http://www.rightscale.com/blog/cloud-industry-insights/cloud-computing-trends-2016-state-cloud-survey> (accessed 3 March 2016).
- Willcocks, L.P., Venters, W. and Whitley, E.A. (2013) 'Cloud sourcing and innovation: slow train coming? A composite research study', *Strategic Outsourcing: An International Journal*, Vol. 6, No. 2, pp.184–202.
- Winkler, T.J., Benlian, A., Piper, M. and Hirsch, H. (2014) 'Bayer healthcare delivers a dose of reality for cloud payoff mantras in multinationals', *MIS Quarterly Executive*, Vol. 13, No. 4, pp.193–208.

- Zott, C. and Amit, R. (2008) 'The fit between product market strategy and business model: implications for firm performance', *Strategic Management Journal*, Vol. 29, No. 1, pp.1–26.
- Zott, C., Amit, R. and Massa, L. (2011) 'The business model: recent developments and future research', *Journal of Management*, Vol. 37, No. 4, pp.1019–1042.