

BUSINESS MODEL EXPERIMENTATION THROUGH TECHNOLOGY AND MANAGEMENT INNOVATION USING CLOUD COMPUTING

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ABSTRACT

Business models have become popular in academia and the commercial environment since the growth of dot.com organisations and the internet era starting in 1999. The fundamental interest in a business model was to provide a commercial way to value an organisation using innovative technology based on future projection as opposed to a valuation based on historical performance. As technology has rapidly advanced since 1999 so has the interest and research around business models including technology and management innovation. The paper reviews business models, technology and management innovation in the context of cloud computing and the potential impact for organisations. Understanding the impact of technology on an organisations business model is outside of the scope of this paper it is an area for further research.

KEYWORDS

Business models; organisations; innovation

INTRODUCTION

Osterwalder (2010) depicts a business model as a set of assumptions visualised using a template called the business model canvas. The business model canvas organises key partners, key activities, key resources, the organisations value proposition, customer relationships, channels, customer segments, cost structures, and revenue streams allowing an organisation to determine if the business model is effective and viable at capturing and delivering value (Teece 2010).

Baden-Fuller and Haefliger (2013) state that business models are linked to technological innovation however the construct of the business model which shows how an organisation captures and delivers value to its consumer is essentially separate from technology. Chesbrough (2007) acknowledges that a better business model often wins over a better idea or technology. Over the last two decades technology has significantly changed the business model of many organisations (Teece 2010), through the adoption of the internet, introduction of cloud computing and widespread consumer adoption of mobile computing. Many organisations today are fundamentally changing the way in which they engage with the customer largely due to technology and customer expectations.

With the introduction of cloud computing this not only has significantly changed the technology the organisations have adopted but also the fundamental business model by which these organisations deliver value to their customers. Organisations are looking at more innovative ways to adopt technology and reduce cost of ownership through engaging suppliers with more advanced business models (Fehrer, Woratschek & Brodie 2018). Organisations are realising that the adoption of technology not only has the potential to capture and deliver value in radically different ways but also to provide additional opportunities for organisations to expand their business model generating additional revenue streams.

This paper briefly reviews the current research on business models in particular the growth and focus on research within business models correlated to the growth of the internet. With the growth in the internet and cloud computing we examine the impact this has had on organisations ability to adopt technology and adjust their business model to create a competitive advantage within the market place. We also examine the evolution of cloud computing to understand the extent and ability by which an organisation can utilise the capabilities to develop a business model around a specific customer value proposition.

As a focus of the ongoing research the impact of technology on the business model and the reciprocal relationship between technology and an organisations business model is not investigated and a topic currently under research.

BUSINESS MODELS

Definition

Organisations have existed for thousands of years to facilitate the exchange of goods and services (North 1991). This exchange of goods and services is facilitated through an organisations business model which is the way in which an organisation captures and delivers value (Teece 2010). DaSilva and Trkman (2014) link the rise of interest in the term business models to the growth in internet companies. The business model offered a way to value innovative companies using technology on future speculation as no historical performance was available for these technology companies embracing technological innovation. DaSilva and Trkman (2014) identified (business model terminology vs Nasdaq composite index) an intrinsic link and exponential growth between the rise in business model terminology and innovative technology companies from 1999 till 2010.

DaSilva and Trkman (2014) uses the resource-based view and transaction cost economics to explain that an organisation resources and capabilities (design skills, supplier relations, cultural factors) only provides value to a customer when coupled with a transaction delivered by the resources. Technology does not deliver value on (Chesbrough 2007) until it supports the delivery of the transaction thus delivering value. Understanding the resource and transaction view enhanced with technology, figure 1, further expands the common definition that value for customers and the company comes from combining resources (including technology) or recombining resources (technology innovation) to support transactions. A key to the research is not only the refinement of the business model definition but also the validation and acknowledgement that technology has the potential to radically change the fundamental ways organisation deliver value to their customers.

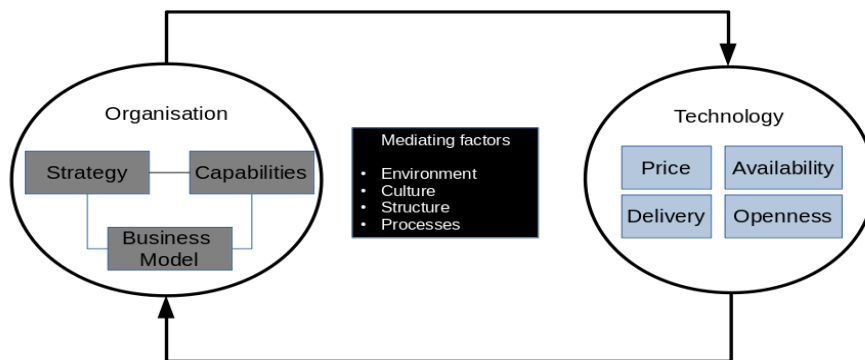


Figure 1: Relationship between organisation and technology to deliver customer value

Adapted:(Chesbrough 2007; DaSilva & Trkman 2014)

Business models reflect an organisations strategy, figure 1, as they depict the way in which the organisation has deployed its capabilities (resources) to support customer needs or transactions (DaSilva & Trkman 2014). This clearly separates strategy, capabilities and business model as three distinct linked constructs.

Patterns

Business models have been defined, described and categorised many ways. From the research by Baden-Fuller and Morgan (2010) a common feature from the research into business models is that organisations are described, and their behaviour identified. Identifying commonality of these descriptions and behaviours allows patterns to be established and as such then applied to similar organisations and behaviours of operation. These patterns or recipes (Baden-Fuller & Morgan 2010) are commonly labelled using the organisations' name or as a description of that business model, for example the Aldi model or low cost / low touch business model.

Labelling and classifying the different organisations and their behaviour enables the comparison of business models across organisations and how successful or unsuccessful organisations are at adopting similar patterns. Organisations wishing to enter certain markets, launch, products and services can use these patterns to understand and mimic the mechanics of value capture and value delivery in comparable organisations.

Table 1: Business Models

Analogy	How it works
Affinity Club	Pay royalties at some large organisation for the right to sell your product exclusively to their customers
Brokerage	Bring together buyers and sellers, charging a fee per transaction to one or another party.
Bundling	Packaging related goods and services together.
Cell Phone	Charge different rates for discrete levels of service.
Crowdsourcing	Get a large group of people to contribute content for free in exchange for access to other people's content.
Disintermediation	Sell direct, sidestepping traditional middleman
Fractionalisation	Sell partial use of something
Freemium	Offer basic services for free, charge for premium service
Franchising	License the brand, goods, services, process and procedures from one main organisation to a franchisee.
Leasing	Rent, rather than sell, high-margin, high-priced products.
Low-touch / Low cost	Lower prices by decreasing service or decreasing the features of the product.
Negative operating cycle	Lower prices by receiving payment before delivering the offering.
Pay as you go	Charge for actual metered usage
Razor / blades	Offer the high-margin razor below cost to increase volume sales of the low margin razor blades.
Reverse razor blades	Offer the low-margin item below cost to encourage sales of the high-margin companion product.
Reverse auction	Set a ceiling price and have participants bid as the price drops.
Partner network	Provide a platform to link consumers and suppliers by providing a service without owning the assets which provide the service.
Product	Pay a license to use and support the product
Product to service	Rather than sell a product, sell the service the product performs.
Standardisation	Standardise a previously personalised service to lower costs

Analogy	How it works
Subscription	Charge a subscription fee to gain access to a service
User communities	Grant members access to a network, charging both a membership fee and advertising

Adapted: (Baden-Fuller & Haefliger 2013; Baden-Fuller & Morgan 2010; Fehrer, Woratschek & Brodie 2018; Ovans 2015; Teece 2010)

Table 1 above outlines some of the different business models' patterns which have been collected from the different research reviewed. The different business models focus on the way a product or service is monetised.

Components

Osterwalder (2010) developed the business model canvas which identified nine components, central component is the value proposition, within the business model to represent the link between strategy and business model. These nine components, figure 2, being key partners, key activities, key resources, the organisations value proposition, customer relationships, channels, customer segments, cost structures, and revenue streams. This visual template allows organisations to quickly understand the resources which are needed to deliver the value proposition for the customer during the transaction and the resulting cost and revenue associated. The business model canvas is a tool and method to develop and iterate an organisations business model. While not specifically identified technology is intended to be included within the key resources' component.

Limitations of the tool include organisation who are looking to expand the business models in Table 1 to a platform business model (Fehrer, Woratschek & Brodie 2018). Platform business models include additional components, figure 2, such as network relationships, collaboration potential for co-creation and technological interfaces to support information exchange. Amazon Web Services, Google Cloud and Azure are examples of platform ecosystems as a platform market which not only provides technology as a service but expands an organisations value chain logic to an open network focussed on network integration and collaboration. The obvious attraction for organisations to this platform business model is the low cost of entry and potential network effect for growth based on the different actors engaged within the ecosystem.

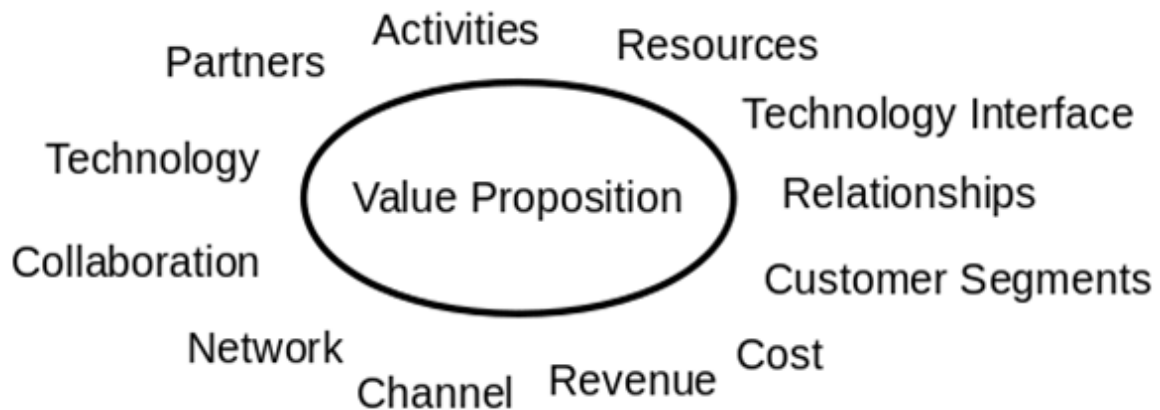


Figure 2: Value proposition central component of business model

Adapted: (Chesbrough 2007, 2010; DaSilva & Trkman 2014; Teece 2010)

TECHNOLOGY INNOVATION

Cloud computing adoption

Cloud computing over the last decade has altered the way an organisation acquires and consumes technology. Amazon, Google and Azure (predominant cloud providers) and others are changing the way in which

organisation consume technology and utilise the technology. Amazon realising, they had an oversupply of technical infrastructure re-purposed this oversupply into a new business model creating a cloud computing value proposition for potential clients (DaSilva & Trkman 2014).

From the supply of technical infrastructure Amazon Web Services, Google Cloud, Azure and other cloud providers have been able to change the way in which technology and services are acquired and consumed by organisations.

Table 2: Cloud Computing Public Cloud Revenue (Billions of U.S. Dollars)

Cloud Service	2017	2018	2019	2020	2021
Cloud Business Process Services (BPaaS)	42.2	46.6	50.3	54.1	58.1
Cloud Application Infrastructure Services (PaaS)	11.9	15.2	18.8	23.0	27.7
Cloud Application Services (SaaS)	58.8	72.2	85.1	98.9	113.1
Cloud Management and Security Services	8.7	10.7	12.5	14.4	16.3
Cloud System Infrastructure Services (IaaS)	23.6	31.0	39.5	49.9	63.0
Total Market	145.3	175.8	206.2	240.3	278.3

Source: Costello & Hippold (2018)

Table 2 above outlines the growth and evolution of public cloud from 2017 till 2021 as predicted by Gartner analysts (Costello & Hippold 2018). The predictions depict a approximately a 100% growth in 5 years with a significant uplift in SaaS, IaaS and PaaS. These trends indicate that organisations are starting to migrate from an acquisition model for infrastructure and technology to a consumption model.

Cloud computing services

Cloud computing no longer provides just technology as a service for organisations but also includes numerous other business model components. Using the business model components we can compare a value proposition being delivered on the cloud versus a traditional on premise solution (Amazon 2019; Google 2019; Microsoft 2019). From the analysis in Table 3 it is clear that the eco-system provides an organisation with more than just technology as a service but an entire suite of services to support the deployment of the solution within the cloud environment.

For an organisation the cost of iterating or modifying its business model is significant (Chesbrough 2010). With cloud computing a significant portion of this cost attributable to technology is diminished as a barrier allowing organisations to adopt and test new services. Technology does not hold any value until it is commercialised and as such the investment in technology cannot be realised (Chesbrough 2007). Organisations which utilise a traditional model to acquire and deploy technology require significant upfront investment in order to develop a value proposition. Should the approach or technology prove incorrect then the investment in the technology does not yield any benefit and as such no competitive advantage for the organisation. In cloud computing services can be explored, tested and validate with minimal upfront investment. If the technology does not yield the anticipated results it can be abandoned for a fraction of the cost.

Table 3: Cloud computing components

Component	Cloud computing	Non cloud computing
Key partners	<ul style="list-style-type: none"> • Cloud provider • Service providers within ecosystem 	<ul style="list-style-type: none"> • Hardware partners • Software partners • System integrators
Key activities	<ul style="list-style-type: none"> • Identify services • Assemble services into value proposition 	<ul style="list-style-type: none"> • Install hardware • Install software • Configure and assemble hardware

Component	Cloud computing	Non cloud computing
	<ul style="list-style-type: none"> Develop and release content within software Service monitoring Business continuity 	<ul style="list-style-type: none"> Configure and implement software Develop and release content within software Hardware and software monitoring Hardware and software patching Hardware break fix Business continuity
Key resources	<ul style="list-style-type: none"> Free training and use cases On demand training Certification Templates and quickstarts Technology as a service Network specialists Security specialists Software engineering teams Product team 	<ul style="list-style-type: none"> Paid training Classroom / on demand training Certification Accelerators Hardware specialist Software specialist Network specialist Security specialists Software engineering teams Product team
Value proposition	<ul style="list-style-type: none"> Bring your own 	<ul style="list-style-type: none"> Bring your own
Customer relationships	<ul style="list-style-type: none"> Bring your own 	<ul style="list-style-type: none"> Bring your own
Channels	<ul style="list-style-type: none"> Direct to customer Direct to partner Cloud market place 	<ul style="list-style-type: none"> Direct to customer Direct to partner
Customer segments	<ul style="list-style-type: none"> Bring your own 	<ul style="list-style-type: none"> Bring your own
Cost structures	<ul style="list-style-type: none"> Try before you buy / Freemium Operating expenses 	<ul style="list-style-type: none"> Upfront investment in technology Maintenance and support fees
Revenue streams	<ul style="list-style-type: none"> Product revenue Eco-system services 	<ul style="list-style-type: none"> Product revenue
Business model	<ul style="list-style-type: none"> Freemium Pay as you go Reserve and save 	<ul style="list-style-type: none"> Product Bundling Leasing

Source: (Amazon 2019; Google 2019; Microsoft 2019)

Currently a limitation of the analysis is the total cost of ownership and the impact on an organisation's financial statements. Cloud computing being pay as you go model impacts operating expenses where the tradition acquisition model impacts capital and operating expenses. The preference and impacts of these costing structures have not yet been assessed and not factored into the analysis.

DISCUSSION

Cloud computing provides technology as a service reducing the barriers to entry and innovation for most organisations. Low cost or no cost services allow organisations to use technology to validate and verify value propositions outlined in business models. Chesbrough (2010) recognises that managers require the ability to not only use tools (business model canvas) to develop business models but also the ability to test and experiment with business models to fully understand the viability and impact of changes.

As cloud computing matures and the providers continue to iterate their offerings from infrastructure as a service to platform as a service and through to software as a service (Chou 2015). Organisations will be able to adopt more commodity services and focus on the competitive services which are required to differentiate their business model within the market. Cloud computing reduces the barriers to entry and rapidly enables

organisations of all sizes to enter markets quickly, even markets which traditionally requires significant capital investment and were highly regulated (Chapman 2019; Temenos 2018).

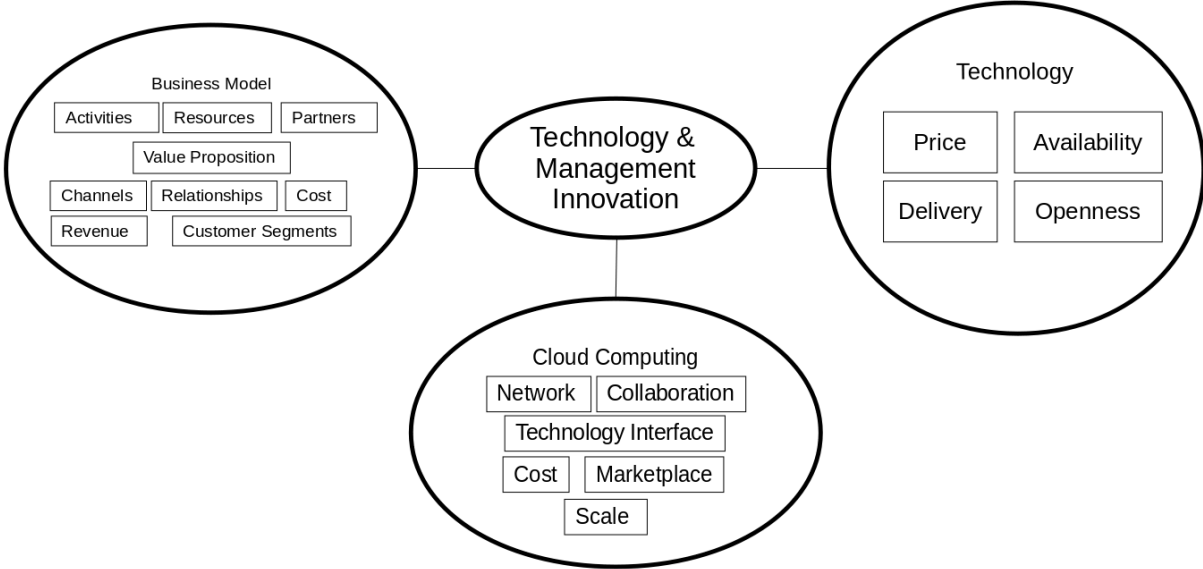


Figure 3: Technology and Management Innovation

Adapted:(Amazon 2019; Baden-Fuller & Haefliger 2013; Baden-Fuller & Morgan 2010; Chesbrough 2007; DaSilva & Trkman 2014; Google 2019; Microsoft 2019)

Using cloud computing services, organisations and managers have the ability to create a working hypothesis (scale model) (Baden-Fuller & Morgan 2010) of their new business models including the technology to support the value proposition. The scale model, figure 3, can be iterated in order to refine the recipe and components of the business model. Non-viable recipes can be abandoned while viable recipes can be adopted and implemented. Uber (Jungleworks 2017) is a working example of this model and approach as they rely on a platform provider to deliver their technology and business model within markets around the world. Uber’s business model is focussed on connecting consumers and producers with no asset ownerships. While being successful other competitors like Lyft, Ola, Grab and Curb (Bhasin 2019) are quickly adopting similar business models.

With the ability to test and validate business models’ organisations can tailor their strategy, capabilities and business models to the specific value proposition for the customers. As discussed previously resources do not provide any value it is only when a customer engages in a transaction then value realised by an organisation. As such the specific value proposition can be enhanced and optimised to ensure the most optimal (efficient and high value) transaction is achieved.

Given cloud computing is an eco-system the opportunity to expand revenue beyond the traditional value chain and take advantage of the network effect (Fehrer, Woratschek & Brodie 2018) within the eco-system exists for organisations. The business model can be expanded to find additional channels and subsequent revenue streams for organisations. Once their business model has been instantiated into a solution, developed and tested, several cloud computing vendors promote organisations to package these solutions for distribution under the market place on the platform. Incentives such as platform credits, dedicated sales channels and training becomes available for organisation who transition away from being purely a customer of the cloud computing provider to a partner thus converting the business model from a pipeline business model to a platform business model. This provides additional challenges to organisations as now they will be required to potentially manage and maintain

the solution for their new customers. The migration from pipeline to platform iterates and changes the business model requiring the organisation to undergo additional changes.

Organisations who truly adopt the platform business model by decomposing their value propositions to a set of services or components will be able to truly take advantage of the platform eco-system through bundling these different services together to create new and unique value propositions (Fehrer, Woratschek & Brodie 2018).

CONCLUSIONS

Cloud computing provides organisations with the ability to adopt, test and learn new technology in support of enhancing, expanding or reinventing their business model. With this ability organisations can experiment and validate business models whilst migrating from a traditional value chain or pipeline model to a platform eco-system. This can be done with minimal to little impact on existing business models and or technology which supports current value propositions.

Cloud computing not only reduces the barriers to technology adoption but enhances an organisations ability to embrace technology and management innovation to support the development of new business models enacting business strategies.

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