

Understanding the Web from an Economic Perspective: The Evolution of Business Models and the Web

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Abstract: The advent of the World Wide Web is arguably amongst the most important changes that have occurred since the 1990s in the business landscape. It has fueled the rise of new industries, supported the convergence and reshaping of existing ones and enabled the development of new business models. During this time the web has evolved tremendously from a relatively static page-display tool to a massive network of user-generated content, collective intelligence, applications and hypermedia. As technical standards continue to evolve, business models catch-up to the new capabilities. New ways of creating value, distributing it and profiting from it emerge more rapidly than ever. In this paper we explore how the World Wide Web and business models evolve and we identify avenues for future research in light of the web's ever-evolving nature and its influence on business models.

Keywords: business models; Innovation, World Wide Web, renewal, competitive advantage

JEL Classification: O33; L17; L20

1. Introduction

Web-enabled business models (or e-business models) continuously gained in prominence since the Web was first devised in 1989. Some of them are electronic reimplementation of traditional value chain functions such as e-commerce, while others define newer ways of adding value, for example through user-generated content. Consequently, strategy scholars and practitioners have shown a growing interest in understanding how the web may contribute to develop and sustain competitive advantages for organizations (e.g. Wirtz et al., 2010; Teece, 2010; Chesbrough, 2010).

The web's functionality has evolved significantly over the past two decades, and it continues to evolve rapidly, opening new possibilities for creating value, distributing it and profiting from those activities. In the early 1990s, when the web emerged, it enabled one-way publishing of information. However by the early

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2000s its functionality developed, enabling distributed users to become increasingly involved in value-creation, co-creation and sharing. This led to an unprecedented network effect, and what is now known as the web 2.0 era was born. In parallel to this rapid growth in adoption, the World Wide Web Consortium (W3C) has been working on standards for what is now referred to as web 3.0 or the semantic web. In previous web eras, humans had to do much of the interpretation of information; the aim of the semantic web technology is to enable machines to do much of the processing by adding meaning to the data that is available on the web. Some posit this new wave of functionality will be just as powerful as the previous ones in terms of its socio-economic impacts.

There for managers have an interest in understanding these changes. In particular they should pay close attention to how they may benefit from and be affected by these new waves of web technology. Strategy scholars also have an interest in understanding how such important changes in the landscape will affect organisational strategies, and more specifically business models. While web 3.0 technologies are in an emergent stage some organisations have already jumped on the bandwagon and it seems opportune to explore each wave of the web's evolution may generate opportunities for organisations.

The remainder of our paper is structured as follows. In the following section we analyse the literature on web enabled-business models and structure it according to the different phases of the web's evolution. Following this discussion we summarise our findings and identify directions for future research in light of the web's ever-evolving nature.

2. Web-Enabled Business Models Literature

A number of studies propose generic e-business models, which fit any web era while others show specific interest in web 2.0 or web 3.0 e-business models. However, most studies overlook how business models evolve through web eras and how future evolutions of the web may impact business models. We assert that adding these dimensions to the research agenda is crucial to better understand business model life cycles and ultimately their evolutionary nature. For this reason we set out to analyse the link between business models and web eras. We identify which web era the studies relate to most closely as well as the components and criteria used to classify business model types. Table 1 summarises in chronological order some of the key studies that have looked at web-enabled business models with an emphasis on the first phase of the web (web 1.0).

Table 1. Web 1.0+ Business Model Studies

Study	Web Era	Business Model Classification Criteria	Business Model Components or Types
Timmers (1998)	1.0+	Degree of innovation, degree of value chain functional integration	e-shop (promotion), e-procurement, e-auction (e-bidding), e-mall (aggregators, sum of e-shops), 3 rd party marketplace (front-end), virtual communities (communication oriented), value chain service provider (supports a function, for example payments), value chain integrator (of multiple functions), information broker (consultancy and information providers)
Tapscott et al. (2000)	1.0+	Network- and value-centered taxonomy (degree of economic control and value integration)	Agora, Aggregation, Value Chain, Alliance and Distributive Network.
Fruhling & Digman (2000)	1.0+	By business-level strategies	Added value, differentiation, cost leadership, focus, growth source
Applegate (2001)	1.0+	Industry structure and competition factor (concept, capabilities, value)	Distributors, portals, producers and three other types of infrastructure providers
Amit and Zott (2001)	1.0+	Drivers by potential sources of value	Novelty, Lock-in, complementarities and efficiency
Wirtz (2001)	1.0+	Integration of sub models	Value proposition model, value creation model, procurement model, market model, capital model and distribution model

Table 1 highlights great heterogeneity in terms of classification criteria used and resulting business model types. One may argue that this is to be expected and even desirable in a nascent field of study. Unsurprisingly Table 2, which covers the web 2.0 era contains the most examples of studies. This is indeed the web era which has sparked a broad interest in business model study and analysis.

Table 2. Web 2.0+ Business Model Studies

Study	Web Era	Business Model Classification Criteria	Business Model Components or Types
Weill and Vitale (2001)	2.0+	Based on transaction governance structure.	Content Provider, Customer-direct, Full-Service-Provider, Intermediary, Shared Infrastructure, Value Net Integrator, Virtual, Whole of Enterprise
Afuah and Tucci (2001)	2.0+	By components	Customer value, scope, pricing, revenue sources, connected activities, implementation, capabilities, sustainability
Dubosson-Torbay et al. (2002)	2.0+	Ontology: Based on 4 pillars	Product innovation, Customer relationship, Infrastructure, Financial aspects
Rappa (2004)	2.0+	Potential sources of value	Brokerage, Advertising, Targeted business, Merchant, Community Subscription, Utility.
Osterwalder (2004)	2.0+	By inter-related components	Infrastructure management, value offering, financial aspects and customer interface
Bonaccorsi et al. (2006)	2.0+	Open Source Hybrid models By components	Costs, cost structure, customers, income, product and service delivery
Brousseau and Penard (2007)	2.0+	By components and sources of value	Costs, revenue source, sustainability, goods and service delivery
Osterwalder and Pigneur (2010)	2.0+	By mode of value generation	Unbundling, Long trail, Platforms, Freemium, Open Source, inverted freemium Open Source, Open innovation
Cheng et al. (2010)	2.0	Generic fields of activities	Collaborator, aggregator, organizer, exchanger, liberator.
Wirtz et al. (2010)	2.0	Generic fields of activities	Content, context, commerce, connection
Lee (2011)	2.0+	Type of providers and web activities	Broad online communities, Focused online communities, Social shopping, Content intermediaries, Virtual worlds, Shared web services

Table 2 spans a much greater timeframe, around a decade, and also presents a great level of heterogeneity in terms of the perspectives and criteria used to evaluate and classify business models. However during that timeframe some approaches such as

Osterwalder and Pigneur (2010) became more mainstream, especially within the industry.

As Table 3 shows, the number of studies that have considered web 3.0 technologies from a business model perspective is far more limited. This may be explained by the fact that as of the time of writing these technologies remain a lead user phenomenon. It is nonetheless important to understand their implications from an economic perspective.

Table 3. Web 3.0 Business Model Studies

Study	Web Era	Business Model Classification Criteria	Business Model Components or Types
Almeida and Lourenco (2011)	3.0	Type of providers: potential sources of value: direct and indirect	Branding, traffic generation, affiliates, advertising, premiums, e-payments, licensing/subscription, subsidized service
Vafopoulos (2011)	3.0	Linked data direct and indirect revenues	Brand, traffic generation, multi-sided, affiliates, marketplace, advertising, sponsorship, customization, subscriptions, community, public

Tables 1, 2 and 3 reveal that the way web-enabled business models are conceived and classified is far from homogenous, as is the case more broadly within the business model literature. The criteria used to define and categorize them are many and at times fuzzy. Some authors such as Lee (2011) insist on the fact that because e-business models continue to evolve, it is important to ensure the clearness of the concept.

From this perspective Osterwalder (2004) presented an ontology framework to help understand business value generation. The study suggests organizing a firm’s e-business structure in to nine dimensions and to evaluate value sources through existing value-exchange between the conceived dimensions. The authors underscore the important relationship between business strategy and business process. Their suggested ontology definition tool explicitly aims to show more ‘concrete’ economic components instead of more abstract ways to assessed-business models. This approach helps measuring exchanged amounts of value between e-business dimensions. An ontology may also be used as a tool to help measure and simulate e-business models (Osterwalder and Pigneur, 2010).The most common dimensions found in ontologies are: the role a user plays, the type of interactions, the nature of the offering, the pricing system, the level of

customization and the economic control (Dubosson-Torbay et al., 2002, Osterwalder and Pigneur, 2010).

Alternatively, e-business models have also been conceived according to the level of internal information within a firm. The logic being that the more a firm relies on information to be productive, the more IT adoption (including web adoption) through effective strategies could drive value(Wijaya et al., 2011).

Another school of thought classifies e-business models based on the existence of a connection between the level of information-integration over the web and the degree of innovation within the organization. This correlation is used as a guideline in e-business model generation. This concept is underneath Timmers' (1998)e-business model framework containing 11 components. It is essentially a mapping done over two dimensions: the degree of innovation within the firm (traditional versus modern ways of doing business) and the range of web-integrated functions within the firm (i.e. the number of web-enabled functions)(Timmers, 1998).

Currie(2004) argued that the relationship between e-business models and corporate strategies has an influence on the nature and the way they are conceived and classified. In a study she led, she analysed some existing models and their components as they relate to strategy, specifically on two dimensions: the associated abstraction level and the underlying competitive focus. Results show that atomic business models are more specific and tend to be used by firms with a lower competitive focus. On the other hand value chain models like Porter's(1985,2001)seemed to be more generic, outward looking and placing a greater emphasis on the competitive concerns.

Using a different perspective Zott & al (2011) analysed existing e-business models and the way they were conceived. They inferred the existence of two levels of components or themes in e-business models: those of first order and those of second order. The first order theme is supposed to help build the main e-business model goal with regards to a second order criteria or theme. For example, in Osterwalder's (2004) first order theme, we find value proposition and customers segments. In the second order theme, importance is given to structural network aspects and externalities (Zott et al., 2011).

Finally such as Weiss & al (2005) suggest the User Requirements Notation (URN) approach as a way to classify e-business models. URN is a generic method usually used by engineers. In business modeling dimension, URN focuses on early stages of development with goals and scenarios and it takes into consideration user requirements, systems functional and non-functional requirements. URN is a goal-oriented requirement language which connects requirements to business objectives. Authors argue that URN may help incorporate the strategic options available to a business to facilitate the definition of an e-business model, and that the same

approach may be used to remodel and classify existing e-business models (Weiss and Amyot, 2005). The URN method also helps visualize business model evolution throughout various stages of development. If we compare this to ontologies put forth by other authors such as Osterwalder or Currie, we see a shared concern: the graphical design aspect and business processes details. However, while ontologies show value exchange flows, URN conceived-models also provide a way to adapt to evolving business requirements. Perhaps research on new blends containing ontologies and URN goal-oriented concepts may generate enriched tools for e-business modelling.

3. Conclusion

A growing interest over the past decade has fuelled progress in developing a better understanding of the web and its socio-economic impacts. However as our brief review highlights it, more work is required in order to generate the insights needed for theory-building and managerial guidance as it relates to web-enabled business models.

A first observation from our review of the literature regards the state of the tools at the disposal of researchers to analyse e-business models. Ontologies and models are currently emerging as bases to analyse how businesses organise to create, distribute and capture value using web technologies. In a pre-paradigmatic era there is a need for empirical and theoretical work seeking to validate and consolidate the key dimensions of business models as they relate to the web.

Our second observation relates to the evolution of the web and its impact on business models. A number of studies have begun analysing and categorizing web-enabled business models, in particular relative to the web 2.0 era. While more work is required on this front, the web continues to evolve and rapidly the web 3.0 wave is emerging. In this new era, with the possibility to delegate more tasks to computers, tasks that previously required human intervention, new evolutions of business models are anticipated, notably in terms of value creation mechanisms, which have already been widely impacted by the web 2.0 technologies. It is therefore important that more research be targeted towards these newer technologies and their impacts on business models.

In summary we believe that research on business models and the web should be carried tightly in line with the evolution of the web, and based on a theoretically-grounded view of the key dimensions of e-business models. Our research will therefore address this important area of contemporary strategy scholarship.

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