

CHAPTER 6

An Interdisciplinary Research Framework to Investigate Electronic Business Models

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1 Introduction

The impact of advanced information and communications technologies (e.g. ERPs, Internet Commerce, etc) on the current way of doing business has raised the interest of researchers on describing and analyzing the new internet-enabled business logic. This interest has been intensified by the great number of e-venture failures, which are mostly caused by firms' inability to incorporate Internet into their business and manage change¹. Research in the area of information technology management has made it explicit that the introduction of advanced IT technologies is a complex issue, and as such it should be examined not only from the IT infrastructure viewpoint, but mainly in terms of organizational strategy, structure and operation. The business model is thus conceived as a focusing device that mediates between technology development and organizational value creation².

The term 'business model' was then introduced to include an ample space of business concepts, in order to communicate in a simplified and structured manner the way firms 'think' and 'operate' in an IT-enabled economy. In most research studies, the term has been defined to denote the organizations' mission, core competence, operations, customer service and internal (organizational) and external (inter-organizational) business structure^{2,3,4}. In some research works, the term was even amplified to refer not only to the internal parameters of an organization transformation but also to the external context that has driven or enabled

this transformation, including mainly the technology and the regulatory framework, the market structure and dynamics⁵.

The ‘business model’ term is not always used to describe the same concept in the same context. The perspective researchers adopt to refer to business models is mainly determined by their interest for a specific aspect of business transformation, whether this is the change on the information infrastructure of the firms, its business processes, the internal and external integration of its functions, or the industrial and social environment in which the organization operates.

This chapter aims to review research on business models under a multi-perspective approach. Towards this direction, the chapter applies a theoretical framework, including eight (8) domains, to examine research on business models and examine work conducted in each domain using a technology (IT/IS) and a management perspective. The chapter concludes by identifying a four-layered scheme for categorizing business models, and consequently research on them, taking into consideration the diversity of stakeholders’ interests and the abstraction level in which analysis is conducted.

2 Studying Business Models under an Interdisciplinary Approach

This section comprises a comprehensive review of research on business models structured under eight domains; 1) Definitions, 2) Components, 3) Conceptual Models, 4) Design Methods and Tools, 5) Taxonomies, 6) Adoption Factors, 7) Evaluation of Models, and 8) Change Methodologies. The methodology followed for the business model literature review as well as the identification and validation of the aforementioned eight domains is thoroughly discussed by Pateli and Giaglis⁶.

The following paragraphs present a review of work conducted under each domain with the aim of facilitating discussion on the interdisciplinary nature of business model research, and mainly indicating the difference between the two primary perspectives (technology versus managerial) in the way they handle the ‘business model’ concept.

2.1 Definitions

Although defining a business model has naturally been amongst the first tasks of early researchers in the area, the concepts surrounding the definition of a business model have been subject to intense debate. The definitions range from quite simplistic statements of the meaning of business models to more complex ones, based on the term's focus and scope.

As such, we have met some quite short but explicit definitions, given under the management perspective, on business models; such as Linder and Cantrell's definition as "the organization's core logic for creating value"⁷ and Magretta's definition as a "story that explains how an enterprise works"⁸. Magretta goes one step further in her research to discriminate the business model concept from the strategy concept. Thus, she explains that business models describe, as a system, how the pieces of a business fit together, but do not factor in one critical dimension of performance, usually competition, as strategy does.

Researchers of the strategic management field have worked on defining business models in more broad terms including liaisons between the strategic and the operational and tactical level. Drawing from theory on transaction costs, Amit and Zott state that; "a business model depicts the content, structure, and governance of transactions designed as to create value through the exploitation of business opportunities..."⁹. Under the strategic management perspective, and with the aim of using business models to link strategy with business processes, Osterwalder and Pigneur define a business model as "a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenues streams"¹⁰.

Quite simple but less inclusive, and thus more focused, is the definition of business model, as it is given under the technology (IT/IS) perspective. IT/IS researchers consider a business model as a "theoretical statement of business requirements for an information system" and face the development of a business model as a software design issue¹¹. In a similar vein, Applegate defines a business model as "a description of a

complex business that enables study of its structure, the relationships among structural elements, and how it will respond to the real world¹². In this case, the graphical design of a business model gives rise to the specification of an information system's data and functional requirements.

2.2 Components

Along with research on defining the scope and focus of business models, a quite great part of research in the area is focusing on decomposing business models into their structural elements. In essence, studies referring to business model components adopt a simplistic approach of partitioning business models and then examining their elements in isolation.

From a management perspective, Rayport and Jaworski argue that a 'new economy' business model requires four choices¹³: 1) a value proposition for targeted customers; 2) a scope of market space offering, which could be a product, service, information, or all three; 3) a unique, defensible resource system; and 4) a financial model, which includes a firm's revenue model, shareholders' value models, and future growth models. Moreover, Osterwalder suggests four pillars and nine building blocks as components framework for describing business models. The four pillars are¹⁴: Product Innovation (Innovation and Learning Perspective), Customer Relationship (Customer Perspective), Infrastructure Management (Internal Business Perspective) and Financial Aspects (Financial Perspective).

2.3 Conceptual models

The primary purpose of a conceptual model is to specify dimensions of business model analysis, identify the main components that are relevant to each dimension, and provide an illustration for each level. The literature review has spotted two general streams of research in this domain. IT/IS field work on developing a business model *ontology*, which encompasses the concepts, relationships, and terms used when describing a business model¹⁵. From the studies analyzed in the literature review, Gordijn *et al.* provide the most rigorous conceptual modeling

approach, which they call e³-value ontology¹⁶. This ontology includes specification of actors, market segment, value offering, value exchanges, value activities, value objects, value ports and value interfaces.

Following a similar approach, Osterwalder and Pigneur propose the *eBusiness model ontology* (e-BMO) that formalizes the elements, relationships, vocabulary, and semantics of a business model¹⁰. The ultimate purpose of both studies is describing a business models in terms of structural elements and processes, which can later provide input for a design or simulation software tool.

In the second stream of research, Hedman and Kalling propose a conceptual business model that integrates diverse aspects of the management perspective; strategy (

In the first stream, researchers from the e.g. market level), organizational theory (e.g. resource level), and IT management (e.g. the activity and organizational level)¹⁷. The inter-relationships between business models and strategy are also conceptualized and discussed by Winter¹⁸, who distinguishes two types of models, the business network model and the business strategy model, each of which employs a different modeling technique for its illustration.

2.4 Design methods and tools

Building methods and developing tools for designing business models has been of intense interest basically for Information Systems researchers, since the embryonic stages of business model investigations. The major stream of research in this sub-domain has historically derived from the technology (IT/IS) perspective, which addresses business models as process models. Under this perspective, a number of process and simulation tools can be applied to design internal business models, aiming at: 1) redesigning existing organizational processes, 2) inventing new organizational processes that take advantage of information technology, and 3) sharing ideas about organizational practices¹⁹.

In conjunction with parallel work on conceptual models, as well as in the standardization of modeling methods and tools (e.g. the Unified Modeling Language²⁰), a great deal of technology (IT/IS) research has focused on designing methods and tools for formulating conceptual

models and automating the design task. In an earlier study, Chen-Berger developed a knowledge-based support tool for business modeling with IBM's Business System Development Method (BSDM)²¹. Also, a research team from the Ecole des HEC (Université de Lausanne) has constructed an XML schema, called eBML, consisting of elements that represent the vocabulary of a model and the relationships between the elements²². This XML schema was later transformed to an improved version, referred to as BM²L (Business Model Modeling Language), which was used to transfer the Osterwalder's Business Model Ontology from the conceptual to the implementation level¹⁴.

2.5 Taxonomies

A great deal of research has been devoted towards developing taxonomies of business models using a set of criteria, such as pricing policy or customer relationship model. Taxonomy frameworks are basically differentiated from the classification criteria applied.

Based on the technology that enables the transformation of the current business logic, and thus under the technology perspective, business models may be discerned into e-business models⁴, Web business models²³, mobile^{24,25} and wireless business models²⁶ and even collaborative (i.e. groupware, e-market) business models^{27,28}.

However the most sophisticated taxonomies are made under the management perspective, where we can see taxonomies of business models based on revenue and position in the value chain²³, functional integration and degree of innovation²⁷, core activities and price-value balance⁷, economic control and value integration²⁹, and sourcing parameters³⁰.

2.6 Adoption factors

Research on factors that can positively or negatively influence the business model adoption is multi-disciplinary by nature, since it includes a wide range of stakeholders (organizations, customers, employees, society) of different requirements and behavior. Key factors that promote or inhibit eBusiness model adoption are grouped into five thematic areas: technology (e.g. system integration, service performance), organizational

(e.g. product characteristics, resources and capabilities), industry (e.g. type of industry, degree of competition), individual (e.g. education, demographic), and societal (e.g. location, culture). Their framework considers the above factors as complementary perspectives, drawing from established theories, such as value chain analysis, resource-based theory, innovation theory, strategic network theory, and transaction cost economics, for extracting factors that affect eBusiness model adoption^{31,32}. While the research is focusing on eBusiness models, the specified parameters can as well apply to other type of technology-enabled business models, such as mobile business models.

2.7 Evaluation of models

While research on adoption factors aims at providing criteria for *ex ante* analysis of business models, research on evaluation of business models focuses on *ex post* analyses and thus aims to assess, rather than guide, business model implementation. The definition of assessment criteria is naturally dependent on the purpose of evaluation, whether it is benchmarking among competitors, choice among alternatives models, risk identification of the model or assessment of the model's feasibility and profitability.

Drawing on concepts under the management perspective, Hamel identified four factors that determine a business model's wealth potential: efficiency in which customer benefits are delivered, uniqueness of the business concept, fit among the elements of the business concept, and profit boosters (increasing returns, competitor lock-out, strategic economies, strategic flexibility)³. Further research on each of these parameters implies investigation of theories such as networks economics, resource-based view, strategic positioning, etc.

In a similar vein, Afuah and Tucci focus their evaluation research on financial parameters, such as measures of profitability and profitability prediction³³.

In a narrower evaluation sense, Gordijn *et al.*, researchers of the technology (IT/IS) perspective focus on assessing the economic feasibility of a business model, based on assessment of incoming and outgoing value (benefits vs. costs and risks) for each actor involved in the IT-automated business process¹⁶.

2.8 Change methodologies

The research works in this domain vary considerably based on the theoretical perspective adopted, which implies a different driver of change (technology, market, organizational factors) as well as the different level in which changes are anticipated (firm vs. industry level). Research in this domain aims at satisfying the practical business need for guidelines towards transforming current organizational or inter-organizational business model under the light of developing or commercializing a technology innovation³⁴.

Adopting a technology (IT/IS) perspective, Papakiriakopoulos *et al.* propose a step-by-step methodology for transforming a business model, responding to the need for introducing a technology innovation³⁵. Again, the utility is restricted in the sense that it applies only to technology-driven business model change, as opposed to change driven by a new market or business opportunity. The analysis is also focused on industry level, which means that it investigates changes on the firms' relationships and value flows with other actors of the same industry rather than changes in the internal organizational level.

Under a management perspective, the Evolaris eBusiness Competence Center³⁶ has developed a methodology for changing business models based on three learning stages identified by literature on Organizational Learning³⁷, as well as a number of system theories, such as System Dynamics, Thinking in Networks and Action Research. The analysis is also focused on firm level, which means that the incurred changes concern the company-specific business model.

Moreover, under the same perspective, Linder and Cantrell provide a general framework that defines a set of change models, classified based on the level of change introduced by the new business model: realization, renewal, extension, and journey models⁷. The identification of four types of change models serves the organizations' need for first identifying its strategy for change (e.g. new markets, new products, new technology infrastructure), and thus the change model, they want to introduce and then building the organizational machinery required for executing their change model. Researchers in the **strategy area** have also worked on another business model transformation, which concerns the shift

from organizational to inter-organizational business configurations. Specifically, Tapscott *et al.* have identified six steps for changing an organization's business model to a b-web model²⁹.

3 Abstraction Levels of Business Models

From the literature review on business model research, we have reached the conclusion that the 'business model' concept has raised the investigation interest of researchers from several different theoretical backgrounds (disciplines) with diverse motivations for research on specific business model aspects (domains). That is why the term 'business model' is widely considered as one of the mostly discussed business concepts within the last five years^{5,38}. Table 1 cross-tabulates the set of reviewed research studies with the eight identified domains under the two principal theoretical perspectives (technology versus management) to which they refer.

Table 1. Key Theoretical Perspectives of Business Model Research

Theoretical Perspectives	Domains	References
Management	Definitions	7,8,9,10
	Components	13,14
	Conceptual Models	17,18
	Taxonomies	23,27,7,29,30
	Adoption Factors	31,32
	Evaluation of Models	3,33
	Change Methodologies	7,29,36
Technology (IT/IS)	Definitions	11,12
	Conceptual Models	16,10,17
	Design Methods & Tools	20,21,22
	Taxonomies	4,24,26,28
	Adoption Factors	31
	Evaluation of Models	16
	Change Methodologies	34,35

The intrinsic multi-disciplinary and multi-aspect nature of business models investigations let us infer that the research lens used differentiates on the level of abstraction that each study assumes for the object or the concept that is modeled. Based on this observation, we can develop a scale of business models, based on the scope of the modeled business object. At the narrowest, least abstract, end of this scale, we can identify models of an organization's structural elements and workflows (for example, UML models), which can feed an information design process. At the broadest, most abstract, end of the scale, we may position models that refer to the industrial and social dimension of organizations' business behavior. Figure 1 illustrates the four analysis and abstraction levels to which the term 'business model' may refer.

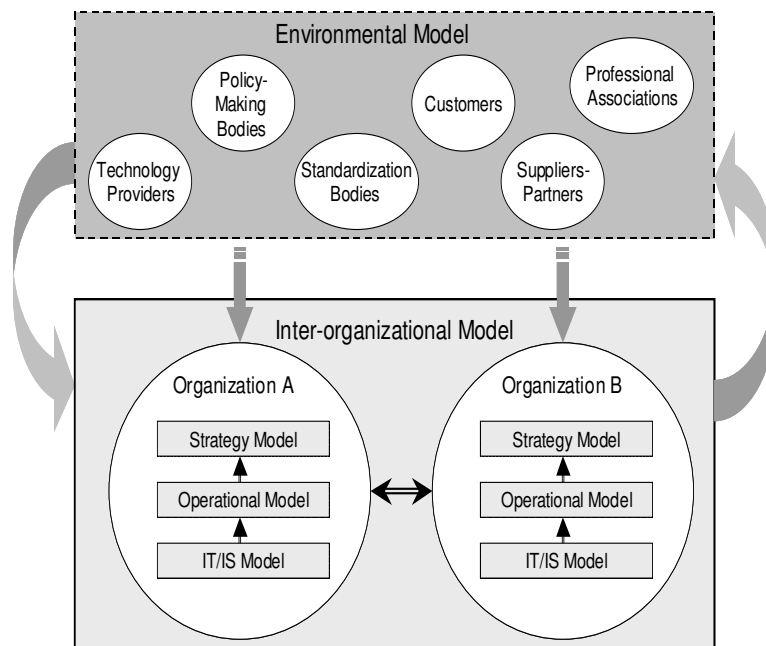


Figure 1. Abstraction Levels of Business Models

3.1 *IT/IS models (data models, ontologies)*

In a quite narrow sense, business models are used in the analysis phase of the software development cycle to communicate the main business requirements for the design of an information system. As such, an IT/IS model depicts the key actors of the business environment, the principal and secondary business concepts (entities), and their logical inter-connections (relationships). Typical instances of these models include those described under an ontology¹⁶, business patterns illustrated with the use of a modeling language, such as UML²⁰, as well as data models defined with the use of an XML schema²².

Research studies on IT/IS models are of interest for information systems analysts and programmers, since they draw on principles from the information systems discipline and focus on either providing a conceptual model or developing a software-based tool for expressing in a pictorial way the business requirements for developing an information system.

3.2 *Operational models (process models, simulation models)*

In a rather broader level of analysis, we can find models of the organizations' daily operation, including internal actors (employees and departments), organizational functions and operations as well as processes that aim at integrating or transacting with third parties (customers, partners and suppliers). Typical instances of these models include process, workflow and simulation models, usually applied for illustrating existing and inventing new organizational processes, communicating business practices among the organization's stakeholders, and testing the efficiency of the current or new process model¹⁹. Investigations on Operational Models concern business analysts, operational and tactical managers. Such research studies can be found in the technology (IT/IS) fields and mainly focus on providing design tools for modeling the business logic of an organization in an operational, rather than strategic, level.

3.3 *Organizational/inter-organizational models (firm models, network models)*

Proceeding to a more abstract level of analysis, we can position two types of models; organizational models, including specification and analysis of a set of organizational management concepts (e.g. mission, resources, capabilities, revenue model, customers), and inter-organizational models, focusing on describing the business configurations (network structures) that enable the delivery of business, customer and network value. In this analysis level, we can identify models mentioned as company value creation models², strategy models¹⁸, value network models^{39,29}, collaborative and e-marketplace models²⁷, to which most recent studies focus.

Both organizational and inter-organizational models meet the practical interest of managers for understanding, analyzing, communicating and even changing their corporate and competitive strategy. As such, models in this group are described drawing on several strategy and management theories (e.g. transaction costs, organizational learning, resource-based view). As the analysis level becomes broader, the number of investigated domains increases. Thus, researchers of organizational and inter-organizational models work on defining them^{27,7,8}, conceptualizing them^{17,18}, decomposing them^{14,13}, classifying them^{23,7,29,30}, evaluating them^{3,33} and changing them^{29,34,36}.

3.4 *Environmental models (industry reference models, market models)*

At the highest abstraction level, we position models that illustrate a set of actors being either individuals or organizations or coalitions, and their interactions in a given market, industry or social setting. Representative examples of such models include industrial models, such as the exhibition industry model of Pateli and Giaglis³⁴, market models, such as the mobile markets models of Mylonopoulos *et al.*⁴⁰, the electronic market models of Timmers²⁷, and the Industrial Age model of Applegate¹².

Research in this quite abstract level concerns individuals or legal bodies in the role of policy makers and derives from strategy and

management theories (e.g. reasoned action, planned behaviour). Reference to these models is mainly made by studies on defining the technology-driven evolution of market and industry models³⁵, as well as in several investigations of factors that affect individuals' and organizations' behaviour towards new business model adoption^{41,31}.

4 Conclusions and Further Research

This chapter has provided a critical review of research on business models within an IT-enabled business environment. In doing so, the chapter presented a theoretical framework, including eight domains, for classifying current research on business models. Each domain was discussed and analyzed drawing on concepts and principles of two primary theoretical perspectives; the management perspective, and the technology (IT/IS) perspective.

Prior reviews and frameworks have examined and synthesized extant research in the business models field under one of these perspectives, usually denoted by the interests and position of the researcher, whether he/she is an information systems analyst, an operational, tactical or strategic manager, or a policy maker. The present literature review framework addresses the limitations of prior review efforts by adopting a 2X8 (2 perspectives, 8 domains) approach to analyze different objects of analysis (business model domains) with the aid of diverse theoretical lenses (business model perspectives). The ultimate purpose of the chapter was not just to leverage the multi-disciplinary nature of existing research, but also to present an opportunity for future research synergies by identifying issues where the intersection of diverse theoretical perspectives is likely to produce progress in the study of IT-enabled business models.

Another goal of the chapter was to advance current understanding about business models by classifying them in an order of abstraction. The level of abstraction is primarily determined by the focus and detail entailed in the unit of analysis. Thus, while we proceed from the IT/IS models to operational, then to (inter)-organizational and finally to environmental models, the focus is shifting from a very specific technology-based construct to a process and workflow illustration, then

to a codification of key organizational and strategy concepts, and finally to a generic modelling of the market, industrial or social environment. This classification scheme aims to facilitate future researchers in positioning their research interests and outcomes in a certain analysis level, and thus identifying the scope of their investigated business model, the concepts that it should comprise, the perspective that should be adopted, and consequently the theories on which they should draw for building new knowledge in the area.

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